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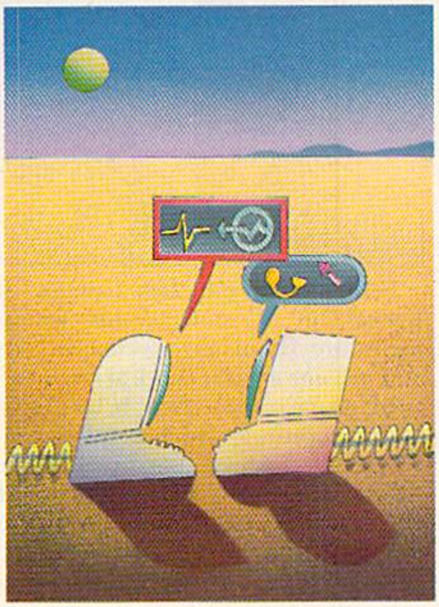

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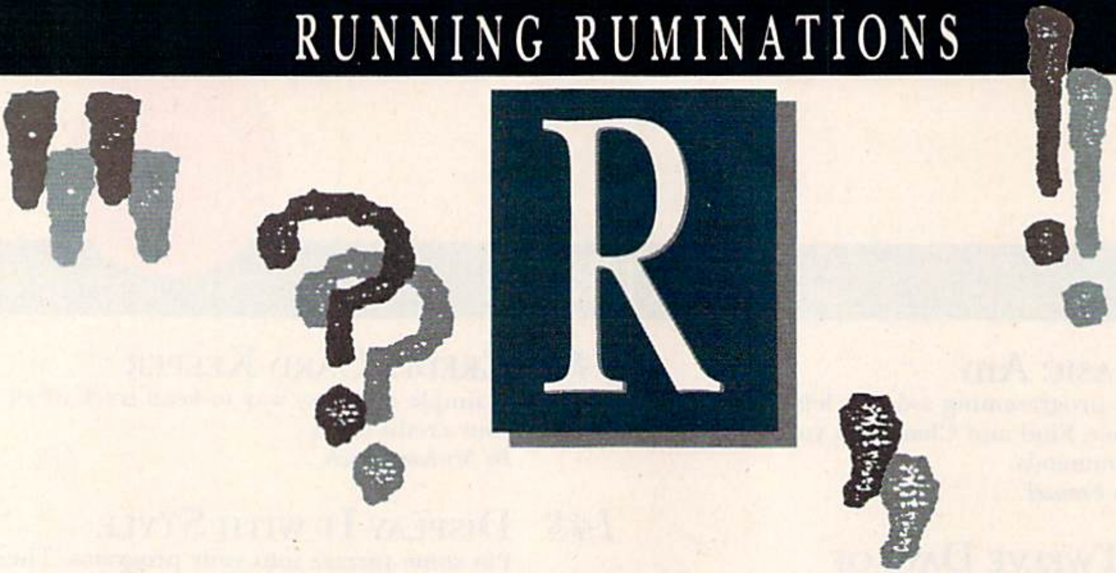


RUNaway Winners Announced

Who is the typical RUN *reader?*

Based on profiles of the recently announced winners of RUN*'s Giveaway Sweepstakes, he's a technician with an extensive background in electronics and several years' experience with computers.*

Or, "he" could be a she, as in the case of the grandmother from Maine who is a complete novice to computers.

Or, he is a 14-year-old high school freshman who aspires to become an aeronautical engineer.

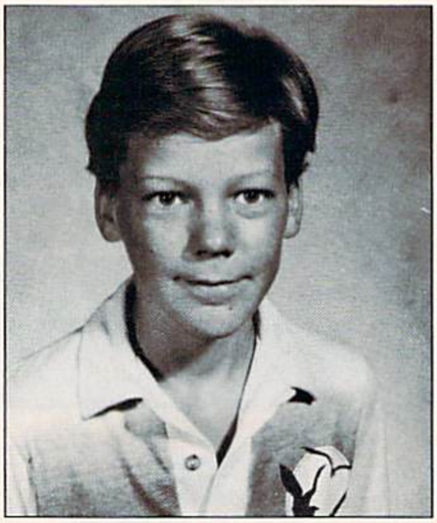
RUN *appeals to a wide variety of readers, and the winners and entrants in the contest reflect this.*

*Inexperienced and skilled, young and old, subscriber and nonsubscriber—*RUN *readers by the tens of thousands sent in their entries for our first-ever $30,000 sweepstakes. Over 90,000 submissions in all.*

The grand drawing was held, and the five lucky winners were randomly chosen by RUN *staff members. We wish to extend our congratulations to those five winners, who will share the $30,000 worth of prizes. We're sure that these hardware and software prizes will be put to good use.*

We would also like to extend our appreciation to all of those RUN *readers who entered the contest, and to the over 100 advertisers who generously contributed their products as prizes.*

Profiles and photos of the five lucky winners follow. If you don't see your name and picture below, well, better luck next time, and thank you for reading RUN.



Fourteen-year-old **Rick Lawson**, of Kansas City, Missouri, has his eyes on the future. He plans to go to Cal Tech and become an aeronautical engineer.

In the meantime, though, he'll stick with computing, which he's been involved in for the past two years. Along with a C-64, Rick owns an IBM computer, monitor and disk drive and an Epson printer. He'd like to get his hands on some engineering software. Upon hearing that he was one of the RUNaway winners, Rick responded, "This is great. Now I won't have to buy a new C-128."

A B+ student, Rick enjoys reading, TV, radio, video games, miniature golf, movies and drawing.

"I couldn't believe that I could be so lucky. I've never won anything in my life, so this came as a complete surprise."

This was **Mike Gazer**'s reaction upon hearing that he had been selected as one of the five winners of *RUN*'s Great RUNaway contest.

Mike, who lives in Brantford, Ontario, Canada, jumped on the Commodore bandwagon three years ago, and now uses a C-64, 1541 disk drive, Pocket Modem, Mannesmann Tally Spirit 80 printer and a color TV for a monitor.

Mike uses his system to keep track of names and addresses for his father's mailing list, to balance his checkbook and to create letters and essays for school. His parents would add another use—running up long-distance phone bills by calling different BBSs with his modem.

It's not surprising that Mike, who is a high school senior at North Park Collegiate, wants to pursue a career in computers.

However, life isn't all chips and blips for Mike. He holds two part-time jobs—as a stock boy and as a furniture salesman—and enjoys playing tennis and baseball and watching football. He's even managed to earn a couple of academic awards—one in history, the other in English—and work as a counselor at a summer camp.

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"The only other comparable product would be Lotus 1-2-3 for the IBM PC; nothing in the C64 world comes even close to the features of Vizastar."
AHOY July 85

"I found Vizastar would do anything Lotus 1-2-3 could, and then some. It's my Commodore choice to become the standard against which the others will be judged."
INFO 64 Magazine, Issue #7

"Vizastar is an exceptional package that rivals the features of programs such as Lotus 1-2-3 and offers C64 owners the kind of integrated software previously only available for higher-priced systems."
RUN Magazine, June 1985

"I scrutinized, tested and experimented with Vizastar extensively, but could find no weaknesses whatsoever. It is the most comprehensive, most flexible, most powerful and easiest to use integrated software package I've worked with."
Commodore Microcomputer, Sept/Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in someways better than 1-2-3."
Steven Roberson, NC. End User

"I have used Multiplan and Superbase; both are good pieces of software, but are inadequate when compared to Vizastar."
Jim Mathews, WA. End User

"So good, I bought a second C64 and Vizastar for my office. A wild bargain! You've saved me from having to buy IBM and Lotus."
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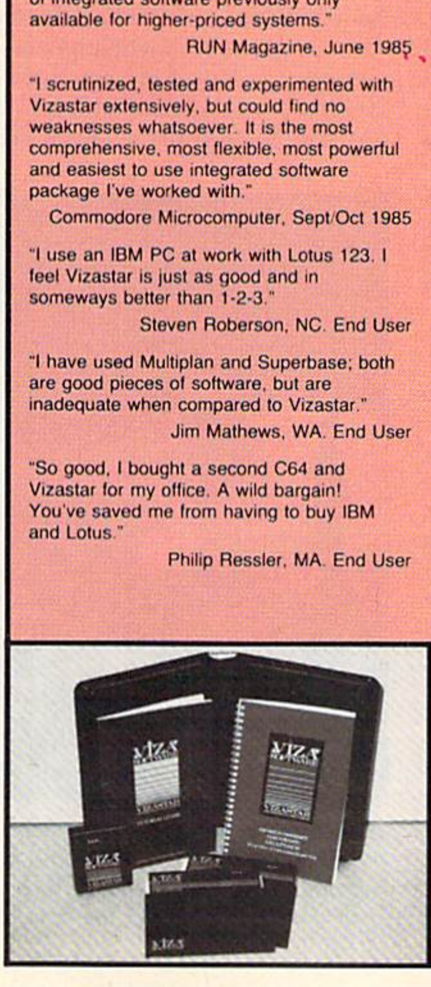

NEW

VIZAWRITE CLASSIC for C128

This is the new word processor from Vizastar's author, Kelvin Lacy and is the successor to Omniwriter, which he also wrote. All the features of Omniwriter are there, plus many significant enhancements, like auto pagination, on-line help, pull-down menus, full-function calculator and more. Up to 8 'newspaper-style' variable-width columns can help with newsletters.

Three different proportionally-spaced "near letter quality" fonts are also built-in for use with Commodore or Epson compatible printers. You can merge almost any other word processor file directly into Vizawrite, including Paper Clip and Omniwriter. Naturally, it is also compatible with Vizastar. At all times, what you see on the screen is exactly the way it will be printed out. Vizawrite can do mail-merges and has an integrated 30,000 word spelling checker that you can expand yourself.

PROGRAM SPECIFICATIONS

Both Vizawrite and Vizastar are written in 100% machine language and run in the 128's FAST mode, making it lightning fast. They require a C128 with 80 column color or monochrome monitor. Both come with a cartridge, a diskette, a backup, and a reference manual. Vizastar also includes a 50 page tutorial book. Both work with 1541 or 1571 disk drives.

RISK-FREE OFFER

Vizastar 128 is priced at **$119.97.** Vizawrite's price is **$79.97.** Vizastar 64 XL8 is now available for **$119.97.** We are so positive you will be satisfied with our programs that we offer a 15-day money-back guarantee. Try it Risk-Free. Call us today or send a check or money order. VISA/MC accepted.

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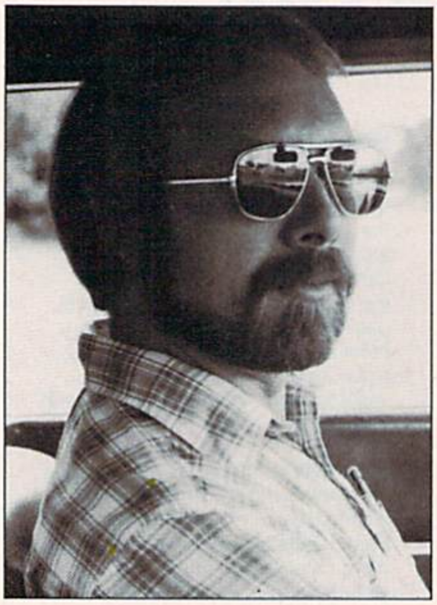
Running Ruminations



"You're kidding me! I'll be getting a C-128 sooner than I expected," was **Ron Hall**'s reaction to the news that he was one of the lucky prize winners.

An experienced computerist of three years, Ron owns a VIC-20, C-64, Datassette, 1541 disk drive, MPS-801 printer, 1702 monitor and VICModem. Amateur astronomy and telecommunications are two of the applications for which Ron uses his system.

Ron lives in Duncan, Oklahoma, with his wife, Carol, and daughter, Stephanie, and is a switching equipment technician with Southwestern Bell Telephone.

When he's not computing, Ron enjoys water skiing, bicycling, hunting, reading and amateur astronomy.

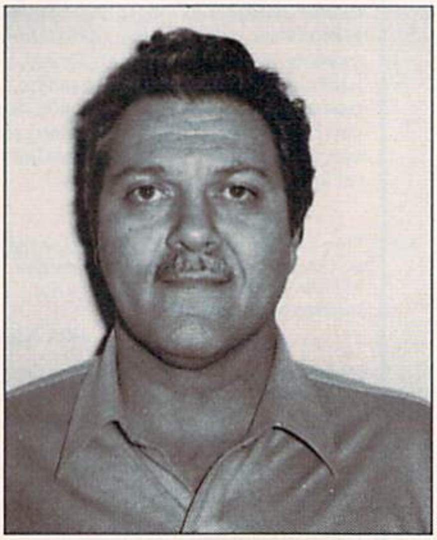
Tony Pellegrini, of Fairview, New Jersey, can't wait to receive his $6000–$7000 worth of prizes.

Tony expressed shock, disbelief and surprise at being one of the five winners, telling us that he had never been such a big winner. "I've won small monetary prizes before," said Tony, "but never anything that could be so adaptable to so many various uses."

Tony intends to take advantage of the C-128's terrific music and graphics abilities, and to use his new system for inventory in hobby applications (bowling and model trains are among his hobbies).

Tony has been computing for one-and-a-half years and owns a C-64, 1541 disk drive, 802 printer and KoalaPad.

A test desk technician at the New York Telephone Company for the past 15 years, Tony, who is single, is presently studying for his real estate salesperson's license.



Lucy Whitman, of Machias, Maine, is very inexperienced when it comes to computers. However, she has five children and two grandchildren who are eager to make use of all her prizes.

"This is great. My children will love it!" Lucy told us upon hearing that she'd been chosen as one of the Great RUNaway recipients.

While Lucy and her children explore the world of software and hardware, Lucy will continue to keep order at Machias Valley Bowling Lanes, which she owns.

Lucy, a widow, enjoys cooking, bridge and, of course, bowling.

And the winners are . . . *Choosing the winners of the Great RUNaway contest was a barrel of fun for* RUN *magazine staffers: (from left) Dennis Brisson, editor-in-chief; Susan Tanona, review editor; Marilyn Annucci, copy editor; Marcia Burke, mailroom supervisor; and Guy Wright, former* RUN *technical editor and currently editor-in-chief of* AmigaWorld.

Circle 47 on Reader Service card.

This is the most interesting football game I have seen.
Howard Boldebuck
Lombard, IL
Police

Thank you for the great game, with printer options.
Daniel H. Antolec
Monona, WI
Police

SUPER BOWL SUNDAY is a very enjoyable game.
Charles M. Bolton
Jacksonville, Arkansas
US Air Force

Excellent game. Best sports simulation I've seen.
Richard G. Miller
Duluth, Georgia
Engineer

The game is unbelievable! A++!
Matt Ritchie
Cisco, TX
Student

Great game, very realistic.
James Antonaccio
Somers, New York
Architect

SUPERBOWL SUNDAY is the "BEST" football game I ever played.
Michael Cwirko
Monroe, NY
Student

Good games — would like good baseball game!
Scott Peterson
Vernon Hills, IL
Sales Manager

"Nice Animation!"
Kevin McGill
Spring, Texas
Student

Excellent game! Can you expand it (more plays, more teams?)
James Heironimus
Enon, Ohio
Doctor

SUPERBOWL SUNDAY is a great game.
Rick Bray
Eugene, Oregon
Clerk

Very good game.
Mike Trimarco
Franklin Park, IL

This program is fantastic!!
Chris Calkins
Seffner, FL
Computer Technician

Excellent quality — OK.
Michael Zoyrko
Neah Bay, WA
USAF

$10,000 REWARD

if you can prove that any of the testimonials shown here are not true or have been altered in any way!

Finally a good graphics, statistical football program. Would like more printer options.
John Sievila
Waukesha, WI
Photo Engraver

This game is fun to get into!
Taylor Thompson
Arlington, Texas
Student

The best game you've come up with yet.
R. Michael Lesher
Whitehall, PA
Engineer

Make a diskette for "SUPER BOWL SUNDAY" that allows me to create teams.
Rick Dakesian
Lincoln Park, MI

SUPERBOWL SUNDAY

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Great game!
Chuck Shea
Las Vegas, NV

More disks! — Coaches disk to create teams; great teams from past — not Super Bowl; college teams.
Greg Addy
Elgin, IL
Credit Approver

Very realistic, would like other sports.
N. Sideratos
Brooklyn, New York
Student

A great game.
Derek Aiello
Warminster, PA
Student

One of the very best sports games!
Jeffrey D. Mailey
Philadelphia, PA
Insurance

I was wondering if you sell 1985 teams, & if you update the disk.
Rick Rosenthal
Peabody, MA
Student

Very impressive game. Good concept and implementation.
Patrick K. Moriarty
Richmond, VA
Programmer

Very realistic simulation with excellent graphics.
Jay Hertel
Sterling, Illinois
Student

These type of games are great to play with your kids (sharpens the mind).
Rod Phillips
Craig, CO
Jeweler

Your game is great, just keep on coming out with more.
Joe Yovino
Cincinnati, Ohio
Student

MAGIC

Compiled by LOUIS F. SANDER

MAGIC is tricks, MAGIC is fun.
MAGIC is doing what cannot be done.

Every month, Magic brings you brief and useful computer tricks from around the world—tricks to make computing easier, more enjoyable or more exciting. We number our tricks in hex, the counting system of sorcerers and computerists.

Magic solicits your simple hardware ideas, short programs, useful programming techniques, little-known computer facts and similar items of interest. We look for new or recycled material that can be implemented with a minimum of time, effort or theoretical knowledge and that is of current value to Commodore computerists (Plus/4 and C-16 owners, too). RUN will pay up to $50 for each trick accepted. Send your tricks to:

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If you enclose a self-addressed stamped envelope, we'll send you a Trick Writer's Guide. Readers outside the United States may omit the stamp.

In this season, when Peace on Earth and Goodwill Toward Men are prominent in every heart, it's satisfying to know that that's what Magic promotes. By sharing ideas from around the world, we make that world a better place to be, at least in our computer rooms.

The other side of the season, of course, is giving and receiving! Lucky are the Magic readers' loved ones, since they're never short of Christmas gift ideas. In fact, I just heard a fellow singing "The 128 Days of Christmas." He may have had a new computer in mind, or maybe just the number of gifts he's asked for. Either way, it's certain he shares our holiday wish to you—Merry CHR$(ISTMAS) and Happy New Gear!

$278 Easy C-64 RUN—Are you tired of typing R-U-N over and over again while working with Basic? Enter POKE 816,32 and your weariness will vanish. After that Poke, pressing the shifted run/stop key will automatically run your program! You can return to normal by POKE 816,165 or by hitting the stop/restore combination.

Craig Johnson
Juneau, AK

$279 Spritestorm—Here is an upgraded version of last month's Commodore 128 one-liner. This one features multicolor sprites that change as they move about. Some of the changes are a sight to behold.

```
10 FOR L = 1 TO 255 : FOR J = 3584 TO 4095 : POKE J,L : NEXT :
   FOR K = 1 TO 8 : SPRITE K,1,K,1,1,1,1 : MOVSPR K,50*K#K :
   NEXT : NEXT
```

For another variation, add STEP2 after the 4095.

Mary Lee McCafferty
Butler, PA

$27A Typing in programs—To lessen the wear and tear on my precious copies of *RUN*, I use a copy machine to reproduce any programs I intend to type into the computer. As I type, I can mark, cut, spindle or mutilate the copy to my heart's content, with no chance of mutilating my magazine.

If the program doesn't run properly, it is much easier to compare a listing with the copy than to work with the whole magazine.

Geneva Hamilton
Fortuna, CA

$27B Printing practice—I have a five-year-old son who is just learning to form his alphabet on special lined paper. You may remember it from your own school days, with its widely spaced lines for the tops and bottoms of the capitals and its dotted line in between for the tops of the lowercase letters.

Instead of buying this paper, I wrote a short program to have my printer form the lines, just like the practice sheets, and to print my son's name at the top of the page. The list-

h the terrorist plot to trigger a massive earthquake in this undersea graphic adventure
QUAKE MINUS ONE
BEYOND
MINDSCAPE
Command the super heroes in this graphic adventure
SHADOWFIRE
BEYOND
MINDSCAPE
Defeat the evil Doomdark in this medieval graphic adventure
The LORDS OF MIDNIGHT
BEYOND
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Circle 10 on Reader Service card.

ing below shows a version for Commodore printers, where CHR$(195) is the horizontal line corresponding to shifted C and CHR$(45) is the minus sign or dash.

If you have a different printer, it shouldn't be hard to make it print similar characters with the line spacing appropriate to your needs.

```
100 REM PRINTING PRACTICE - D. BORKIN
110 T$="PRACTICE FOR MATTHEW"
120 FORJ=1TO79:SL$=SL$+CHR$(195):NEXT
130 FORK=1TO79:DL$=DL$+CHR$(45):NEXT
140 OPEN4,4
150 PRINT#4,SPC(40-LEN(T$)/2);T$
160 FORJ=1TO9
170 PRINT#4:PRINT#4,SL$
180 PRINT#4:PRINT#4,DL$
190 PRINT#4:PRINT#4,SL$
200 NEXT
210 CLOSE4
```

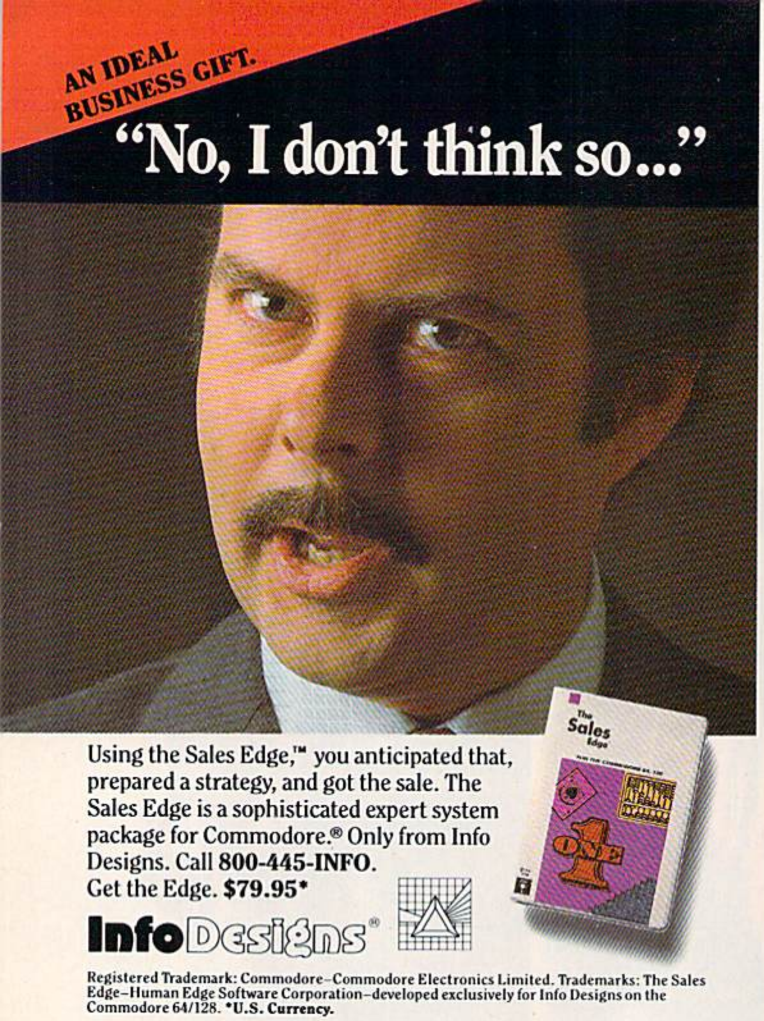
David Borkin, Jr.
Dearborn, MI

$27C Designs!—Here are two short programs that will give you a swatch of fabric, wallpaper, gift-wrapping paper or a rack of Christmas neckties. Run program #1, and you'll get an interesting repetitive pattern, chosen at random. Press any key except S, and you'll get a totally different one. Press S, and you'll get a table of numbers that are characteristic of that design. Run program #2 and enter those numbers, and you'll see the design repeated.

The possibilities in this are endless, and some of the designs are striking to behold. The odds are 2,519,040 to 1 against seeing the same one twice.

```
100 REM DESIGNS! #1 - ELIZABETH OMAN
110 REM PRESS 'S' TO SEE SPECS
120 REM PRESS OTHER KEY TO SEE DESIGNS
130 B=INT(RND(0)*16):S=INT(RND(0)*39)+2
140 CH=INT(RND(0)*256)
150 CC=INT(RND(0)*16):IF CC=B THEN130
160 POKE53280,B:POKE53281,B:PRINT"{SHFT CLR
    }"
170 FOR L=-1 TO 1000 STEP S
180 POKE1024+L,CH:POKE55296+L,CC
190 NEXT
200 GETA$:IF A$="" THEN 200
210 IF A$="S" THEN 230
220 GOTO 130
230 PRINT"{CTRL 1}";:IFB=0THENPRINT"{CTRL 2
    }";
240 PRINT"BACKGROUND="B
250 PRINT"STEP="S:PRINT"CHARACTER="CH
260 PRINT"CHARACTER COLOR="CC:GOTO200

300 REM DESIGNS! #2 - ELIZABETH OMAN
310 INPUT"BACKGROUND (0-15)";B
320 INPUT"{6 SPACEs}STEP (1-41)";S
330 INPUT"CHARACTER (0-255)";CH
340 INPUT"CHAR COLOR (0-15)";CC
```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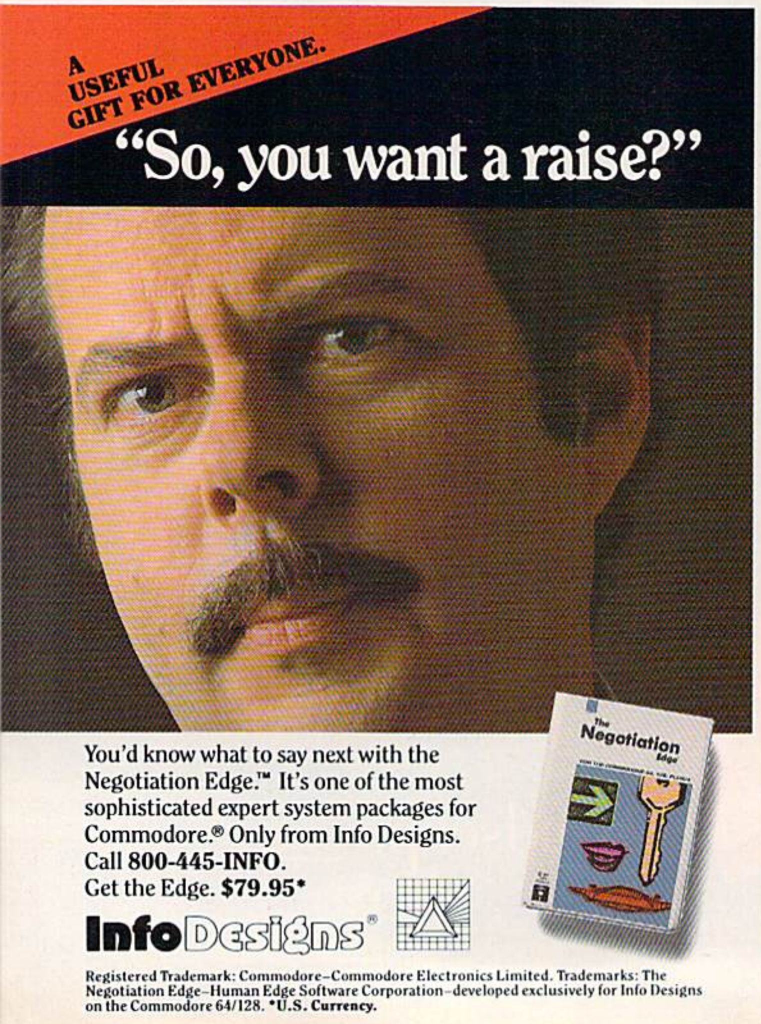
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```
350 POKE53280,B:POKE53281,B:PRINT"{SHFT CLR
    }"
360 FOR L=-1 TO 1000 STEP S
370 POKE1024+L,CH : POKE55296+L,CC
380 NEXT
390 GETA$:IFA$=""THEN390
400 POKE53281,6:PRINT"{SHFT CLR}{CTRL 2}":E
    ND
```

Elizabeth Oman
Lindsborg, KS

$27D Season's spritings—These sprites add festive finery to all your Christmas greenery. Though brilliant in their way, their strong points are form and symmetry. Plug them into last month's display programs or put them on the screen yourself.

```
81 REM CHRISTMAS SPRITE #1 - L. SANDER
82 DATA 000,126,000,003,255,192,015,255
83 DATA 240,031,255,248,063,255,252,063
84 DATA 255,252,127,255,254,127,255,254
85 DATA 127,255,254,127,255,254,127,255
86 DATA 254,063,255,252,063,255,252,031
87 DATA 255,248,015,255,240,003,255,192
88 DATA 000,126,000,000,000,000,000,000
89 DATA 000,000,000,000,000,000,000,013

91 REM CHRISTMAS SPRITE #2 - L. SANDER
92 DATA 000,000,000,000,000,000,000,000
93 DATA 000,000,024,000,000,024,000,000
94 DATA 060,000,000,060,000,000,126,000
95 DATA 063,255,252,015,255,240,003,255
96 DATA 192,000,255,000,001,255,128,001
97 DATA 231,128,003,195,192,003,000,192
98 DATA 006,000,096,000,000,000,000,000
99 DATA 000,000,000,000,000,000,000,099
```

L.F.S.

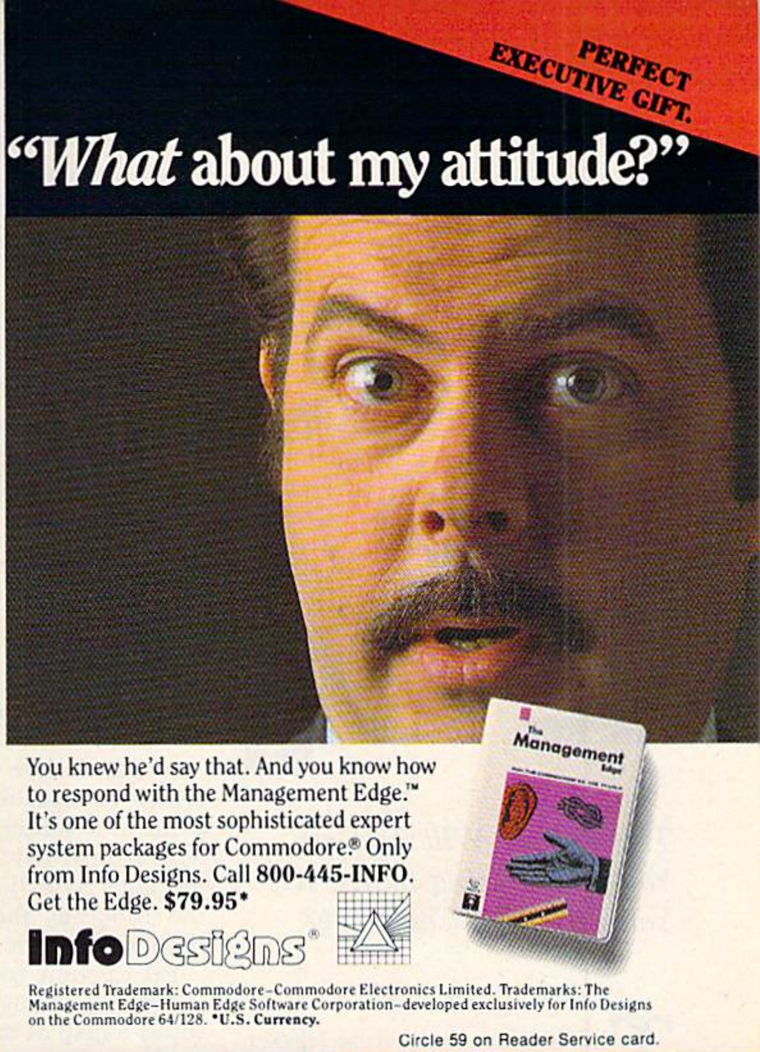
$27E Sprite troubles—When checking for sprite collisions on some C-64s, you find a colliding sprite that suddenly disappears. These are called sparkles, and the best way to avoid them is to check each location twice. If you detect a collision on the first check but not on the second, your collision was really a sparkle.

Steven Davis
Address Unknown

$27F DEF FN wizardry—Commodore Basic only allows one argument in user-defined functions, but this limit should not be taken seriously. I use functions with no arguments or with multiple arguments.

For example, when using the Read statement, it's useful to know from which line the data is being read. On the C-64, the line can be found by entering:

Continued on p. 166.



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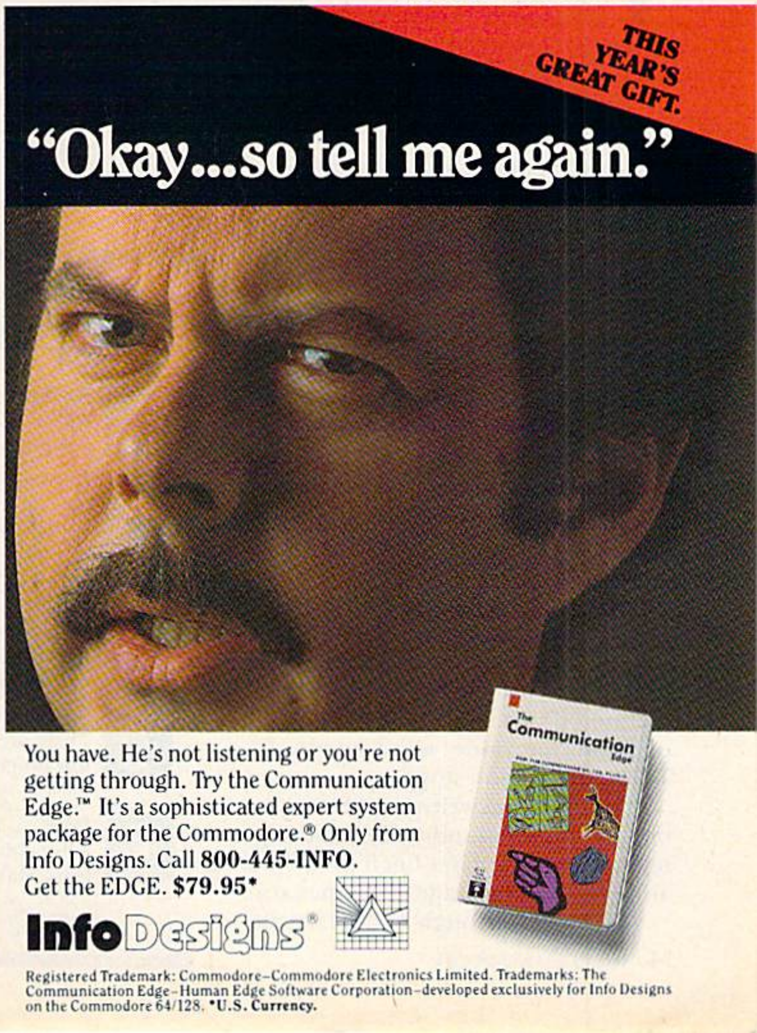
Circle 59 on Reader Service card.



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Compiled by SUSAN TANONA

Hacker

A

This Puzzle Will Test all Your Computing Skills. Are You up to the Challenge?

The best way to describe Hacker is to say as little as possible and to hope you'll be sufficiently intrigued that you rush out and buy it.

The mystery begins as soon as you open the package. Your only instructions are on how to load the disk.

After a brief loading interval, the screen turns blue and letters appear on the screen, clacking in the manner of a teletype or a message being received by modem. The message itself—"Logon, please:"—is enough to indicate you've accidentally engaged your modem and have made contact with—someone.

You try logging on, only to be informed that you have made an error. Please try again. Press H for help and you'll be told that the code word for help is now the same as the name of the test site. Test site?

You try again, are rebuffed, and told the datalink will be terminated in five seconds. The seconds are counted down while you try to think of what the code word might be. Then, the cursor stops.

It starts again, writing gibberish on the screen, when suddenly, a message tells you security has been breached, and a second message welcomes you.

You're in! Through a glitch in the host computer, you've been admitted to—what?

Almost before you can react, the screen changes to show you a blueprint of a subterranean robot unit. Screen instructions tell you to aim the laser (laser?) at various parts of the robot as the nomenclature is flashed upon the screen.

Let's assume you do it. Once again, the screen changes. The lower half shows a map of the world, the upper seems to show a window flanked by cryptic labels.

The screen clears, back to the familiar, non-graphic screen of the datalink. They seem to think you're one of them and the message you read is truly frightening in its implications: What these people are about to do could have global consequences.

The only way for you to save the world is to hang on, maintain the link, maintain the deception and learn as much as you can about whatever is going on.

If you manage to maintain the link, all of your computer skills will be called upon. You'll have to solve logical problems; you'll have to build sparse clues into theories and then test them; you'll continually be running a maze that is usually blind; you'll have to traffic with spies all over the globe; you'll have to decipher phrases in many foreign languages; you'll have to put together evidence that will show the world what these people are doing.

They know an intruder is in the system. You're going to have to bluff your way past checkpoints, memorize code words and run that maze, before time runs out and they pull the plug.

You can be quite sure that you'll keep going back to this puzzle, again and again, until you finally have it solved. Hacker is that kind of game.

I'll admit I was a bit put off by the graphics screens. I expected Hacker to be an all-text adventure, completely emulating a tenuous modem contact. But, by the time I had solved my second or third puzzle and was allowed to proceed, I was completely caught up in the game and the only conclusion I came to was that this game was done just right. *(Activision, 2350 Bayshore Frontage Road, Mountain View, CA 94043. C-64/$29.99 disk.)*

Ervin Bobo
St. Peters, MO

Report Card

A ***Superb!*** An exceptional program that outshines all others.

B ***Very Good.*** One of the better programs available in its category. A worthy addition to your software library.

C ***Good.*** Lives up to its billing. No hassles, headaches or disappointments here.

D ***Mediocre.*** There are some problems with this program. There are better on the market.

E ***Poor.*** Substandard, with many problems. Should be deepsixed!

A Printer For All Reasons

Search For The Best High Quality Graphic Printer

If you have been looking very long, you have probably discovered that there are just too many claims and counter claims in the printer market today. There are printers that have some of the features you want but do not have others. Some features you probably don't care about, others are vitally important to you. We understand. In fact, not long ago, we were in the same position. Deluged by claims and counter claims. Overburdened by rows and rows of specifications, we decided to separate all the facts — prove or disprove all the claims to our own satisfaction. So we bought printers. We bought samples of all the major brands and tested them.

Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We didn't want a "close-out special" of an obsolete product that some manufacturer was dumping, so we limited our search to only those new printers that had the latest proven technology. We wanted to give our customers the **best** printer on the market today at a bargain price.

The Results Are In

The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the SP-1000 from Seikosha, a division of Seiko (one of the foremost manufacturers in the world). We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing at a respectable 100 characters per second, and with a very readable 12 (horizontal) by 9 (vertical) character matrix. This is a full bi-directional, logic seeking, true descender printer.

"NLQ" Mode

One of our highest concerns was about print quality and readability. The SP-1000 has a print mode termed Near Letter Quality printing (NLQ mode). This is where the SP-1000 outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 24 (horizontal) by 18 (vertical). This equates to 41,472 addressable dots per square inch. Now we're talking ***quality*** printing. It looks like it was done on a typewriter. You can even print graphics using the standard graphics symbols built into your computer. The results are the best we've ever seen. The only other printers currently available having resolution this high go for $500 and more *without* the interface or cable needed to hook up to your computer.

Features That Won't Quit

With the SP-1000 your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 35 character styles including 13 double width and 3 reversed (white on black) styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about how to print H_2O or X^2. This fantastic machine will do it automatically, through easy commands right from your keyboard. Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) or use *italics* to make the words stand out. Or, if you wish to be even more emphatic, underline the words. You can combine many of these modes and styles to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line. You have variable line spacing of 1 line per inch to infinity (no space at all) and 143 other software selectable settings in between. You can control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and . . . VOILA! The letter now fits on one page.

NEW
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$259.95

Forms? Yes!
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Do you print forms? No problem. This unit will do them all. Any form up to 10 inches wide. The tractors are adjustable from 4 to 10 inches. Yes, you can also use single sheets. Plain typing paper, your letterhead, short memo forms, labels, anything you choose. Any size to 10″ in width. In fact this unit is so advanced, it will load your paper automatically. Multiple copies? Absolutely! Use forms (up to 3 thick). Do you want to use spread sheets with many columns? Of course! Just go to condensed mode printing and print a full 136 columns wide. Forget expensive wide-carriage printers and changing to wide carriage paper. You can now do it all on a standard 8½″ wide page, and you can do it quietly. The SP-1000 is rated at only 55 dB. This is quieter than any other impact dot matrix printer that we know of and is quieter than the average office background noise level.

Consistent Print Quality

Most printers have a ribbon cartridge or a single spool ribbon which gives nice dark printing when new, but quickly starts to fade. To keep the printers output looking consistently dark, the ribbons must be changed quite often. The SP-1000 solves this problem by using a wide (½″) ribbon cartridge that will print thousands of pages before needing replacement. (When you finally do wear out your ribbon, replacement cost is only $11.00. Order *#2001.)*

The Best Part

When shopping for a printer with this quality and these features, you could expect to pay around $500 or more. *Not now!* We sell this fantastic printer for **only $259.95! You need absolutely nothing else to start printing — just add paper.**

No Risk Offer

We give you a 2-week satisfaction guarantee. If you are not completely satisfied for any reason we will promptly refund your purchase. A 1-year warranty is included with your printer. The warranty repair policy is to repair or replace and reship to the buyer within 72 hours of receipt.

The Bottom Line

Be sure to specify the order # for the correct version printer designed for your computer.

Commodore C-64 & C-128, Order #2200, cable included

IBM-PC and compatibles, Order #2100, plus 8′ cable #1103, $26.00

Standard Parallel with 36 pin Centronics connector, Order #2400, no cable

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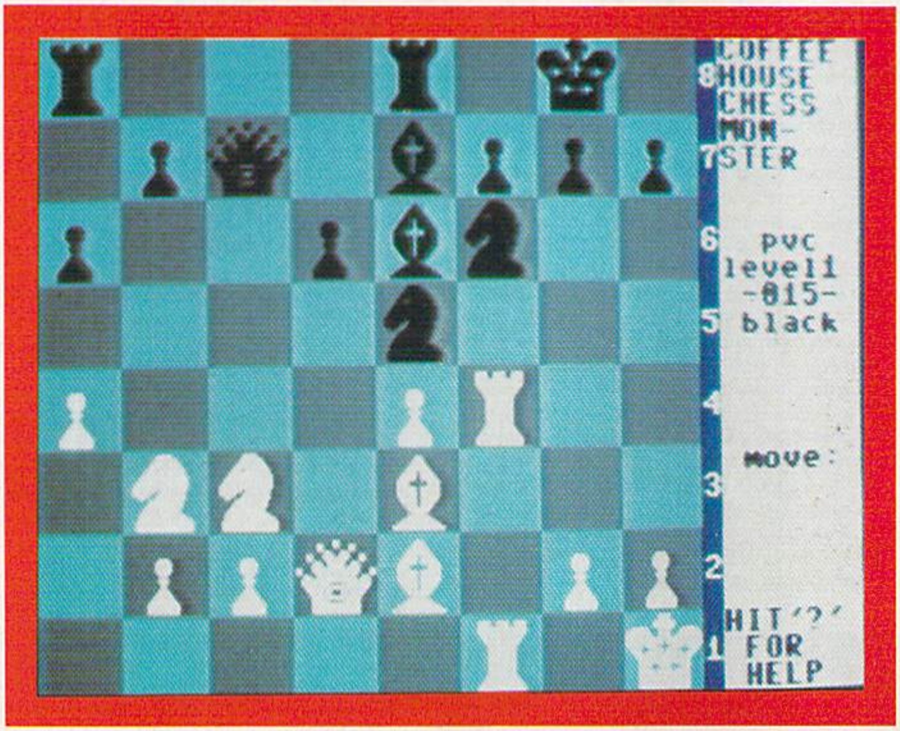

Paul Whitehead Teaches Chess

A

A Tutorial to Help You Sharpen Your Skills as a Chess Player

Paul Whitehead Teaches Chess is a terrific program for the serious chess player. It includes chess rules and strategy for the beginning and intermediate player, plus the "Coffeehouse Chess Monster," which is the best chess game I've seen on the C-64. Graphics are outstanding and the system is speedy, especially since nearly every screen includes a hi-res chessboard.

I can't recommend this program if you've never played chess. The program has all the information to begin play, but a novice may have trouble putting it together without outside help. Printed documentation is brief. It tells how to load the program and access the excellent internal documentation. Nothing in the package gives a plan for learning chess systematically from the ground up.

However, a chess player with a little experience can spend many profitable and fascinating hours with this chess tutor. Easy-to-use menus break up the rules of the game, the tactics of the pieces, chess openings and end-game strategy into manageable chunks. Each section is illustrated with one or more chessboards. (Two data disks provide 631 such boards, most of which are part of short play sequences.)

Getting around the tutor is quite simple. One-key commands step you backward or forward through successive menus or example moves. You can access any chessboard by number, or switch back and forth between the tutor and the game.

The boards tell the story in this program. Explanations are brief. The result is that you can go through the tutorial many times, learning new things as your playing skill matures.

The Coffeehouse Chess Monster game is excellent. The board and pieces are beautiful, and play is smooth and fast, without the distraction of redrawing the screen after each move.

The game offers eight levels of play. Games match you against the computer or another player, or you can watch the computer play itself. Level 8 permits infinite time for plays, although you can force the computer to move. Playing time on other levels varies from ten seconds per move to about two minutes.

For the student, this game offers several valuable features. When the computer moves, it prints each move it is considering on the screen. Also, if you make a bad play and don't realize it for several moves, you can undo as many moves as you wish. This lets you experiment with different strategies.

If you are only mildly interested in chess, Paul Whitehead Teaches Chess is probably not for you. But if you love the game and want to become a power player, this program is a must. And, when you've learned all it has to teach, Enlightenment has expert-level titles waiting in the wings. *(Enlightenment, Inc., 1240 Sanchez St., San Francisco, CA 94114. C-64/$49.95 disk.)*

Annette Hinshaw
Tulsa, OK

ApSoft-64

B

This Package Lets You Run Many Apple Programs On Your Commodore 64

The C-64 has prompted the creation of many different Basic extensions over the years. There is yet another CBM Basic extender out now, but this one has a new twist.

ApSoft-64 gives the C-64 added speed (up to five times faster for disk loads) and easy-to-use graphics and sound commands. The twist is that it adds compatibility with many Apple II programs through the use of 45 extra Basic commands, many of which are identical to Applesoft Basic.

ApSoft-64 doesn't actually give your C-64 the ability to read AppleDOS disks, but it does let you type in Applesoft listings from a hard copy, save them onto your Commodore formatted disks and then load and run them whenever the ApSoft-64 program is

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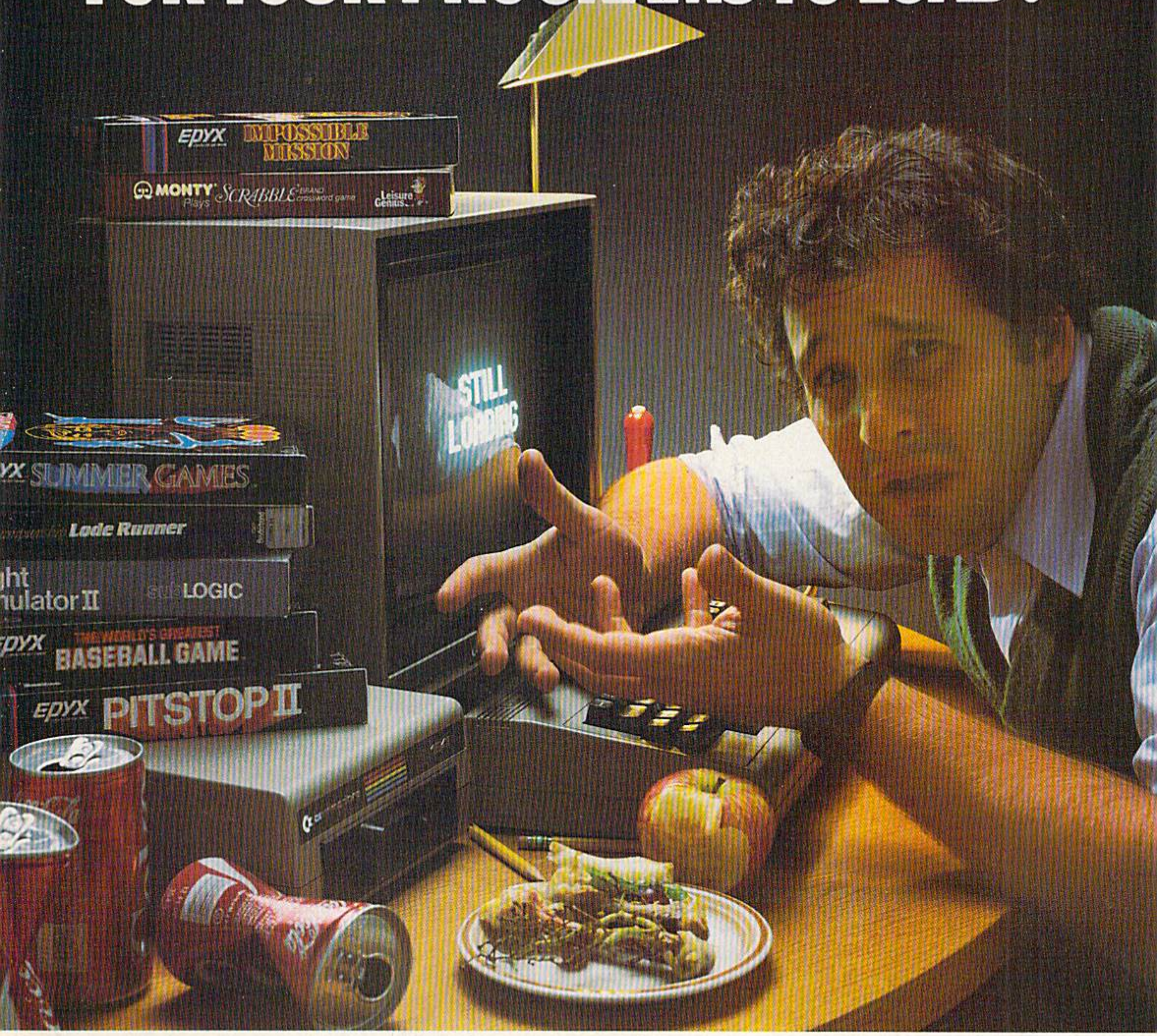
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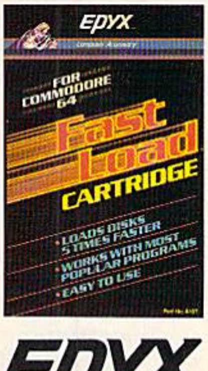
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resident in memory. You can also continue to run many of your C-64 programs with ApSoft-64.

Using a C-64 terminal program, or the small one provided with ApSoft-64, you can download public domain Apple programs from BBSs and other on-line sources, save them to your Commodore disks and later run them with ApSoft-64 in memory. Additionally, you can use ApSoft-64 for creating your own programs.

With ApSoft-64 active, you can run no-frills Applesoft programs. Some of these Apple programs may need some modifications before you can run them successfully. Among the problem areas are those Apple programs with commands for disk, file handling, scrolling windows, hardware functions and programs that contain machine language routines. Problems are to be expected, and FS! Software has done a good job of anticipating the difficulties.

Included on the disk is a program that will help you to analyze and convert Applesoft programs to the C-64. Also provided is a well-documented manual that gives memory maps of ApSoft-64 and the C-64, a list of reserved words and DOS-command conversions.

Also included on the ApSoft-64 disk are many short demo programs and several public domain programs that are well known among Apple users.

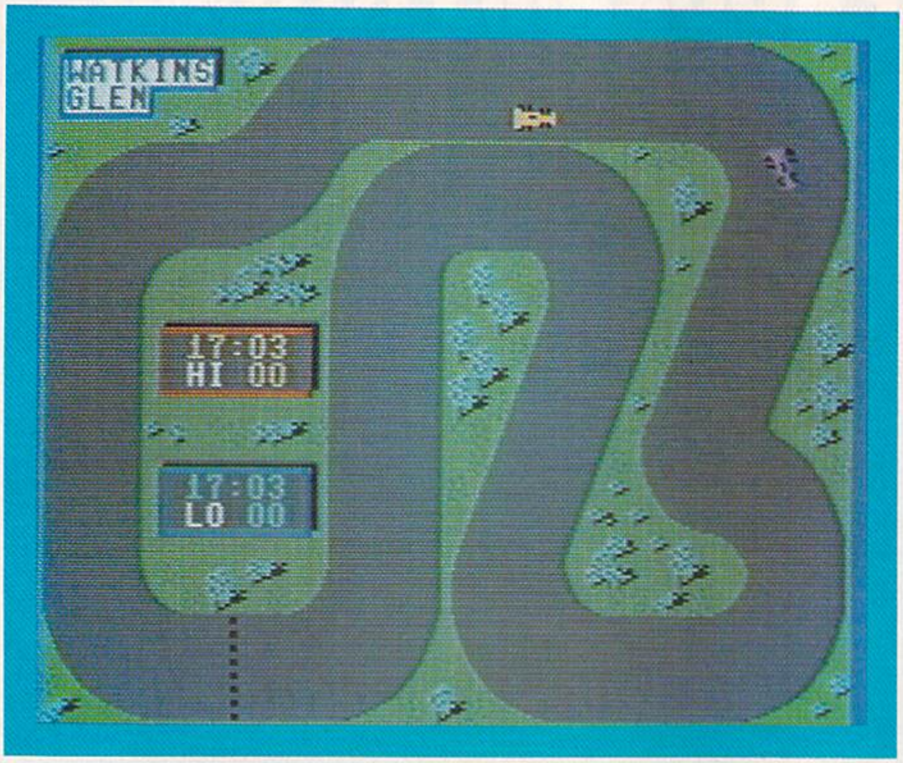
ApSoft-64 claims to make your C-64 "think it's an Apple." My first question was, "Why bother?" The C-64 has so many excellent programs, full-featured Basic extensions and public domain software libraries that it seems like gilding the lily to add Apple compatibility.

There is one good reason for using ApSoft-64. For students who have a C-64 at home and an Apple II at school, ApSoft-64 could be the answer to homework problems. A student could do programming homework on a C-64 (running like an Apple), make a hard copy of the assignment, and bring it back to school for evaluation by the teacher or to type in on the school's Apple for testing. The student wouldn't be able to share disks between the two computers, but the hard-copy program listings could be shared and the programming practice at home would be helpful.

Also, if the school has a BBS, Apple programs could be downloaded to the home C-64, and C-64 ApSoft-64 programs could be uploaded into the school computer.

ApSoft-64 is worth looking into if you have both an Apple II and a C-64 on which you do programming. *(FS! Software, PO Box 635, Faribault, MN 55021. C-64/$39.95 disk.)*

Margaret Morabito
***RUN* staff**



On-Track Racing

A

Here's a Car-Racing Simulation That's Realistic and Fast-Paced

At first glance, you might not think On-Track Racing is capable of providing the kind of realistic racing excitement that several other driving-simulation programs might. On-Track's graphics appear somewhat simplistic—the cars more closely resemble strange insects than precision racing machines.

But the first time you boot up the game, you'll realize that looks are, indeed, deceiving, as game play more than makes up for the relative lack of sophisticated graphics.

On-Track is an easy game to play, but a difficult one to master. Maneuvering your car around the track is much more difficult than the manual makes it sound. The cars are very responsive and move quickly around the racetrack. The slightest movement of the joystick will send your racer careening wildly off the racing surface and onto the grass. That's the kind of precise steering you'd find in a high performance race car.

The cars handle the way real racing cars handle. When you go into a turn, the car will have a tendency to slide sideways; you can use this to your advantage during competition, the way professional racers do.

Don't, however, get the idea that you need to have raced—or even driven—cars to enjoy this game. Even if you've never driven a real car, you'll soon find yourself getting a feel for the kind of handling and maneuvering you need to get around a racetrack as quickly as possible.

The many play options available in On-Track help guarantee you won't soon grow bored with it. You

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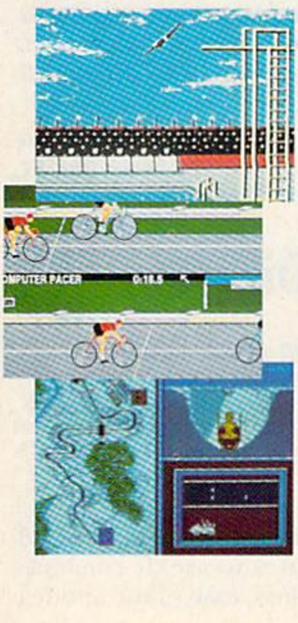
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can run solo practice laps, race against a real opponent or challenge a computer-controlled foe. You can drive a manual or automatic-shift racer and choose a car that best suits your requirements for any combination of acceleration, top speed, handling and braking ability. Then decide whether you want to run on a paved or dirt surface and choose from any one of ten famous courses on which to compete. Finally, indicate whether you want to compete for best time or greatest distance covered.

The options are presented in sequence and are menu driven, so it helps to familiarize yourself with them before you begin making your selections. Making your choices is a very simple procedure, but the program's instructions make it seem difficult. The program's only real fault, in fact, is an instruction booklet that is a bit confusing and also somewhat childish in its treatment of the game.

The game, on the other hand, is anything but childish. Actually, most small kids will probably have a great deal of difficulty maneuvering around the track. That's not a criticism, but rather, a compliment. The graphics may look childish, but game play is very sophisticated.

Don't compare On-Track to other driving-simulation games, as it doesn't try to be like them. This program has a lot going for it. If you do go for a spin with On-Track, I don't think you'll be disappointed. *(Gamestar, 1302 State St., Santa Barbara, CA 93101. C-64/$29.95 disk.)*

Scott Wasser
Wilkes-Barre, PA

Super C Language Compiler

B

This Package is a Solid Implementation of the C Programming Language

The C programming language has received a lot of attention over the past few years, owing to its facility for use in a wide variety of applications.

Abacus Software's Super C Language Compiler is a fairly complete implementation of the C language (the standard Kernighan and Ritchie version). In fact, Super C incorporates some features, such as enumerated types, that have become part of the language, but have not yet been implemented on other C packages.

Super C does have some shortcomings. The compiler does not support either bit fields or in-line assembly code, nor can programs make use of command-line arguments. In addition, I found that most public domain C source code needed to be changed somewhat in order for it to compile using Super C. If you plan to write software for your Commodore, you won't run across these problems. If you plan to modify software to run on your C-64, however, I recommend first becoming thoroughly familiar with all of Super C's nuances.

The Super C package consists of a 195-page manual and a copy-protected distribution disk. The disk contains a loader program, a copy utility, a screen editor, a compiler, a linker, a standard header file, two library files and some sample files and programs.

The documentation is broken down into two major parts: a user's guide, which consists of a tutorial on using the package and a basic introduction to C; and a system guide, which deals with the same subjects in more detail. I found this organization confusing, requiring a lot of page-flipping. The index, too, is difficult to use because entries are keyed to section number instead of page number.

One of the nice features of the compiler is that compilation errors are automatically written to a disk file that you can reference when you are debugging the source code. Another plus is having two text areas in the editor, which allows you to refer to one file while working on another, or transfer blocks of text between areas.

One questionable feature of the editor allows the programmer to assign a color to each line of source code. This is of limited value, because I think it's a difficult feature to make use of, and it results in source files having to be stored in a special format.

Software development using Super C is an arduous task, because the distribution disk must be swapped with the disk holding the source code at each step of the edit-compile-link cycle in order to load the respective Super C program. Programmers will soon tire of this endless disk swapping. Owning two disk drives won't help, as Super C does not directly support multiple devices.

Once debugged, programs can be linked to run from Super C or directly from Basic. The latter option will save you the headache of loading the Super C loader every time you want to run a compiled and linked program.

Abacus Software will answer any of your questions over the phone. When I asked them about support for command-line arguments, in-line assembler code and multiple drives, I was told that such ideas were being considered or in the works. I was also told that registered users will be charged a nominal fee ($10–$15) for upgrades, but that bug fixes would be free.

I suspect that Super C will have an appeal among two groups of Commodore users: those who are eager to learn C; and those who are interested in developing software for the C-64 in a language other than Basic. Super C is slightly overpriced, yet within the bounds of reasonable cost for an adequate C programming language package. *(Abacus Software, PO Box 7211, Grand Rapids, MI 45910. C-64/$79.95 disk.)*

Alex Lane
Jacksonville, FL

Show Director

A

A Program that Will Inspire a New Generation Of Movie Directors

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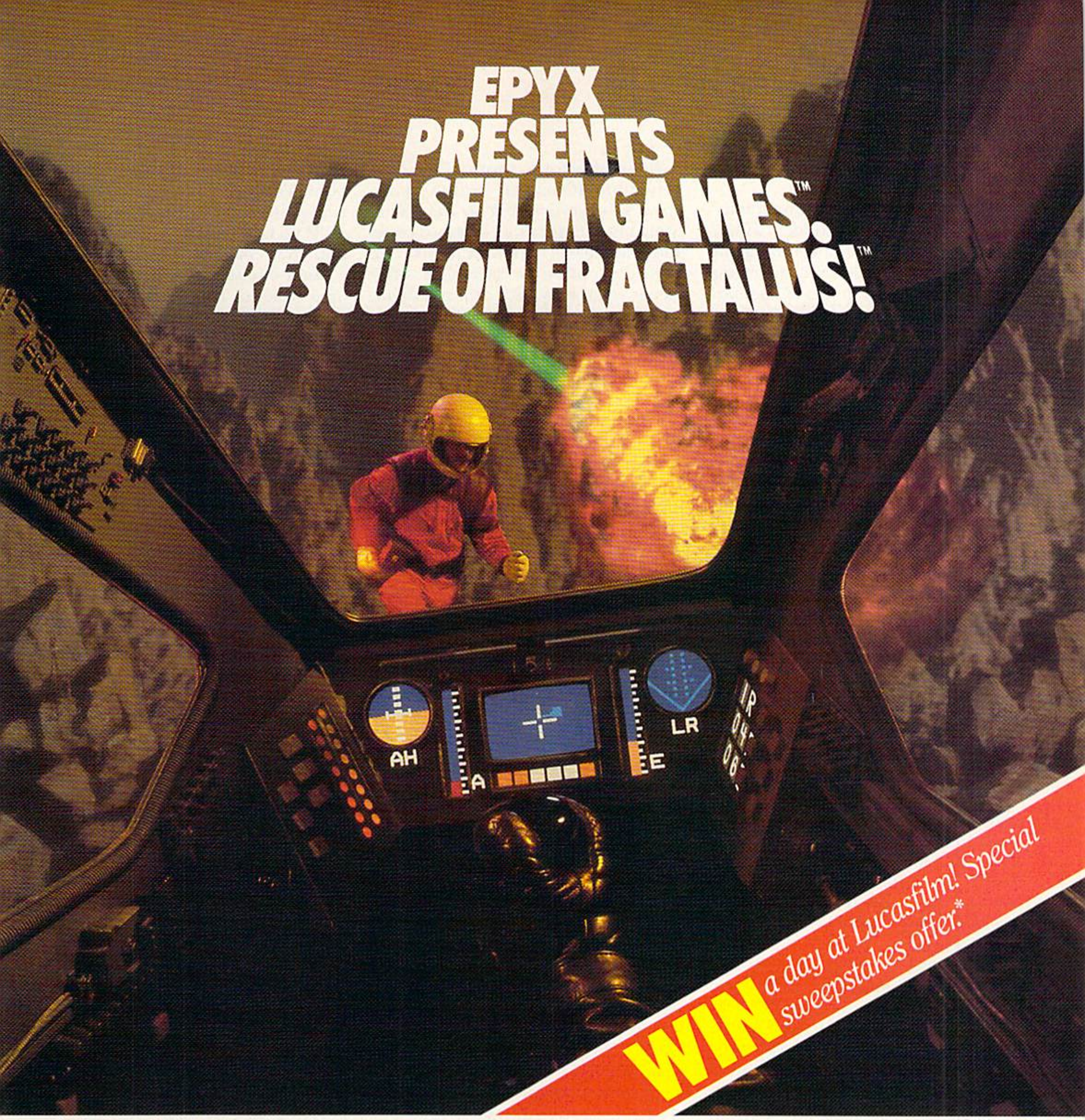
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tures that are sure to quicken young minds.

This is a discovery program, rather than a drill program. Hidden within that discovery are the beginnings of word processing skills, creative writing and the elements of drama and graphics design. Despite some limitations, Show Director successfully touches upon a universal, mind-expanding experience—the love of stories.

Creating stories is what Show Director is all about. You, the director, write a script of up to three pages, before or after you create animated scenes to go along with your script. Each show may have up to three scenes, with as many as four characters in a scene.

To construct a scene, you begin by selecting a background. Show Director provides twelve ready-made backgrounds and a Design Your Own Background feature. You page through the scenes with a joystick or the cursor keys. The twelve scenes divide into four settings that should spark any child's imagination: a prehistoric cave, a haunted mansion, an enchanted forest and pyramids in a desert.

The Design Your Own Background option doesn't require drawing skills. This screen is divided lengthwise into three pieces. The program offers four choices for each section, and you can mix and match the three levels, creating a total of 24 possible combinations.

You choose a cast to play in the scene from among 40 characters (people, animals and objects) that range from cave people and monsters to a butterfly or a motorcycle. All cast members can be animated for 30 seconds within a scene.

As the cast members move, they change perspective. For example, if you move the caveman to your left, you see his left profile. The animation is smooth and the result is quite realistic. As you place additional cast members into a scene, the program replays the moves you've already programmed so that your characters don't get in one another's way.

Once you lay out the action in your scene, you can add sound effects or mood music by choosing whatever is appropriate from a menu. The menu also provides an Oops option, in case you change your mind.

Show Director has some annoying limitations. It's easy to create a scene, but making everything in the scene come out the right way takes practice and patience. I would also like to have the option to save successful scenes separately, so I can mix them for more than one show. The script is your written story, and it always precedes all of the scenes in the show. I would like to be able to play a page of narrative before each scene.

I recommend Show Director in spite of these limitations. Even beginners can create an impressive-looking show. The program is designed for children ages eight and older. It is simple enough not to frustrate its youngest users, but it will also challenge and entertain much older would-be directors. *(Mindscape, 3444 Dundee Road, Northbrook, IL 60062. C-64/$34.95 disk.)*

Annette Hinshaw
Tulsa, OK

The Sea Voyagers

B

Sail for New Worlds With History's most Daring Adventurers

CBS Software has established itself as a publisher of software that is both educational and entertaining. One of its latest C-64 releases, The Sea Voyagers, is an interactive history lesson that is based on 30 of the world's greatest sea-faring explorers. Through a series of four learning activities, the program teaches you about the voyages of men such as Vespucci, Balboa, Ponce de Leon and Magellan, and then tests you on what you have learned.

The first activity, "Explorer Profile," lets you select any of the 30 explorers and provides you with a graphics presentation of his life and voyages. In addition to the explorer's portrait and full name, the profile screen features a map of the world on which an animated line traces the explorer's voyages.

Other information detailed on the profile screen includes the voyager's life span, voyage dates, the countries he sailed for, the names of his ships and a list of other achievements.

"Who Goes There?" is a one-player quiz that challenges you to identify a randomly selected explorer based on a series of clues. After each clue, you are given a chance to name the explorer. The fewer clues you require, the more points you score.

The third activity, "Explorer Mix," presents you with three explorers and three facts that you must correctly match. Although this may help to reinforce what you've learned in the first two activities, it's really not challenging enough to be much fun. First, assuming the original combination is incorrect, there are only five other possible combinations. Second, many of the facts are dead giveaways, so you can often narrow the choice down to one or two combinations. This activity would have been much better using five to seven explorers and maybe even a timer to create more of a challenge.

Finally, "Explorer Match" is a poker-type game that uses the voyagers as playing cards. You are dealt five explorer cards and may discard once in order to create your best hand. You hold onto explorers with something in common (such as the country for which they sailed). This activity has two difficulty levels and can be played either solo or against a friend. Again, even the difficult level is a little too easy; but it's still an interesting way to get a history lesson.

The Sea Voyagers comes with a flexible vinyl overlay for the keyboard that makes learning and playing the four activities a breeze. The program also features on-screen instructions and a 27-page booklet that provides brief biographical sketches of the explorers, background information on their reasons for exploring, sea vessel design, and more.

Although some of the activities could be just a bit more challenging, this program presents a lot of valuable historical information in an entertaining format. *(CBS Software, One Fawcett Place, Greenwich, CT 06836. C-64/$39.95 disk.)*

Bob Guerra
Charlestown, MA

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But you've got a plan. If you and your trusty Science Droid can scavenge the right combination of weapons and technology—and get off the planet alive—you'll make it big. Destroy the Guardian base and you'll even be a hero! The treasures of the Ancients are yours . . . if you've got what it takes.

	C64/128	ATARI	APPLE
Koronis Rift	✓	✓	✓

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Magnificent Modems

With all the recent interest in telecommunications, you may be thinking about getting involved. This comparison of several popular modems available for your Commodore should help you get started.

By JOE MOONEY

If you're in the market for a modem, this article should help you decide what kind of package is best for you. I've taken a look at several popular modem/software packages available for the C-64, with the hope of giving you a good idea of the kinds of choices you have. Once you know what features are available to you and which of those you'll need, selecting the right modem will be a much simpler task.

Until recently, modems and high-quality software were generally sold separately. Although many modems were sold with some form of software, it was usually of very rudimentary quality (such as a dumb terminal emulator, written in Basic). Today, the trend is toward selling modems and high-quality software as one package. This can save you money, because the cost of these packages is usually less than that of the hardware and software if purchased separately.

Modem Uses

There are many things you can do with a modem/software package. It allows you to access commercial information services such as CompuServe and The Source, as well as local bulletin board systems.

You can also use a modem package to access a computer system where you work, allowing you to do some of your work at home, or transfer files back and forth.

If you have a friend with a modem, you can communicate with one another through your computers. In most cases, you don't have to have the same kind of computer, provided that your communications software is reasonably flexible. It is also possible to transfer text files and programs between your computers.

This is only a beginning. There is much more that you can do with a modem. For more information on the subject, see Margaret Morabito's series on telecommunications, which began in the May 1985 issue of *RUN*.

Volks 6420

This package consists of the Volks 6420 modem, manufactured by Anchor Automation, and AutoCom IV software, from Madison Computer.

Address all author correspondence to Joe Mooney, 3275 Mountain Highway, Apt. 309, North Vancouver, BC, Canada V7K 2H4.

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—King Lear

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The AutoCom IV software offers certain convenient features not found in the other packages. It has the ability to dial and automatically log onto a host system. A unique log-on sequence can be specified for each number in the program's phone list. Using its automatic log-on capability, the software can access another system at a preset time, and then transfer its memory buffer to the remote system. Thus, you can send data during the off-peak times of the day and take advantage of reduced rates offered by long distance carriers and information services.

One drawback to this feature is that the automatic log-on sequence must be specified with less than 39 characters. This is an arbitrary and unfortunate restriction.

This package will also automatically answer calls, storing any received data in its 30,000-character buffer.

AutoCom IV provides a block-check protocol to transfer Basic or machine language files. Unfortunately, because this is not a common error-checking protocol (such as XModem or Punter), it can only be used for transfers between two C-64s, both of which must be using AutoCom software.

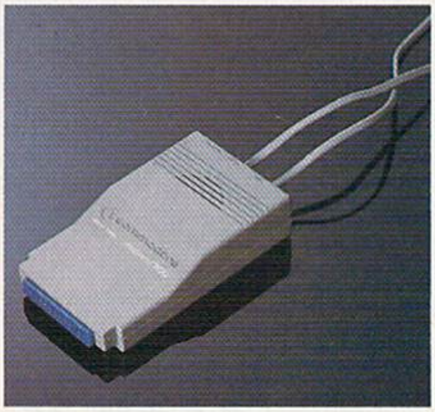
A rather nice touch is the screen-saver feature, which clears your monitor screen if the keyboard has not been used for more than ten minutes.

There are no disk-wedge commands provided, so you must exit the program in order to format a disk, delete a file, and so on.

The 6420 modem has an Answer/Originate switch and a built-in speaker, and it provides touch-tone and rotary dialing. Unlike the Modem/300, which emits a loud, unpleasant noise when not in use, the 6420's speaker produces a barely audible sound that didn't bother me at all.

This package boasts the longest warranty period—five years—of any of the products reviewed here. The manual is short, clear and well-written.

Overall, this is a high-quality product. Its strong points are the dual-mode dialing ability and automatic calling and log-on capabilities. The package's drawback is its software, which is not as feature-packed as some of the other packages. *(Anchor Automation, 6913 Valjean Ave., Van Nuys, CA 91406. $99.)*



Modem/300 (1660)

The Modem/300 package consists of a Commodore model 1660 modem and terminal software, called HiggyTerm.

HiggyTerm is a high-quality terminal program, although it does not have as many features as the other packages. This, however, has certain advantages; the program is very easy to use, it loads more quickly than any of the other programs and it has the largest memory buffer—over 40,000 bytes.

This is the only package in this review whose software is not copy-protected. Thus, you can keep a copy of the modem software on the same disk as your datafiles, eliminating the need to constantly switch disks.

I found it rather frustrating that when you change terminal parameters (such as parity and stop bits), any existing connection is broken. Thus, you must log off each time you wish to change these parameters.

Although it does transfer text files, the software does not provide an error-checking transfer protocol.

The Modem/300 can make a connection using either touch-tone or rotary dialing. I have mixed feelings about the built-in speaker. Although it's handy when placing a call, it can be quite annoying at times. From the moment the C-64 is powered up until a connection is made, the modem

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emits a loud, very aggravating noise.

The manual is clear and easy to understand, with high-quality binding and printing.

The advantages of the Modem/300 package are its ease of use, dual-mode dialing capability, large memory buffer and unprotected terminal software. Although it has somewhat fewer software features than the other packages, you should find it quite adequate for general-purpose use. *(Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380. $119.95.)*

MPP 1064

The MPP 1064 modem, originally manufactured by Microbits Peripheral Products and packaged with VIP Terminal software (from Softlaw Corp.) is now being marketed by Supra Corp., which has lowered the price of the modem and no longer includes the VIP Terminal software. Because these two products worked so well together, I decided to keep them in this review and continue to treat them as a package. However, you will now have to buy the modem and software separately.

The VIP Terminal software provides menus and icons to control its operation. Menu options can be selected by either the keyboard or a joystick. I found the extensive buffer management features (especially the full-screen editor) to be very useful. I also like being able to use the 64- and 80-column screen formats.

The only negative point about the software is that it has a rather small memory buffer (about 7K). However, this is not a serious limitation, because data can be uploaded or downloaded directly to a disk file; thus, the buffer size is not too important (see "Communications Software: A Vital Link," by Jim Grubbs, *RUN*, November 1985).

The 1064 modem appears to be very well designed and built. This is the only modem with status LED indicators, its own power supply and a cable that attaches to the user port. The only switch is an on/off switch; everything else is automatic.

The manual is clearly written and even contains a brief data communications tutorial. I did notice a few more typographical errors in this manual than in the others.

Overall, I was quite impressed with this package, as it is both powerful and easy to use. *(Supra Corp., 1133 Commercial Way, Albany, OR 97321. $69.95.)*

Mitey Mo

The Mitey Mo modem is manufactured by Computer Devices International and comes bundled with Smart 64 software, from Microtechnic Solutions.

The terminal package offers a number of very powerful features, as well as a great deal of flexibility. As a result, the software is more difficult to use than the other packages.

This is the only package that offers the option of redefining the entire character set. This feature allows you to communicate with virtually any system. An accompanying disk wedge gives you complete control over the 1541 disk drive.

I found the XModem file-transfer protocol to be quite useful. It's one of the most common of error-checking protocols, especially with local bulletin board systems. The software provides a number of file-conversion utilities, including conversions to and from CompuServe .IMG format files.

One handy feature is the screen-dump option, which sends the current screen contents to the printer.

Another unique feature of the software is its ability to support a variety of 80-column cartridges (such as Video Pak 80 and XL-80, from Data 20 Corp., and BI-80, from Batteries Included). The software can emulate a VT-100 terminal when used in conjunction with the XL-80 cartridge.

Although the software is copy protected, a utility is provided to make backup copies of the system disk. This process takes 22 minutes.

The manual is larger and more comprehensive than any of the others. Unfortunately, its poor organization makes it somewhat difficult to use.

Mitey Mo
CDI

The Mitey Mo modem performed quite well for me, and I did not encounter any notable problems or limitations. This package offers a wealth of features, many of which are not included in the other packages. As it is less easy to master than the other packages, I would not recommend the Mitey Mo package to those who intend to make only infrequent use of their modems. However, if you have special requirements or will use your modem often, you should definitely consider the many features offered by this package. *(Computer Devices International, 1345 Doolittle Drive, San Leandro, CA 94577. $119.95.)*

Recommendations

Before I state my preferences, I'd like to make it clear that all the packages I tested performed adequately. There are no poor-quality packages here, and the average modem purchaser would most likely be satisfied with any one of them. No single package offers every possible feature; whichever package you choose, you will have to make some trade-offs.

Also, note that I have made this choice without regard to price. I suggest you look closely at the combination of prices and features before deciding on the package that's right for you.

The best package, overall, is the MPP 1064 modem with the VIP Terminal software. It's the easiest to use. Both the hardware and software are of very high quality, with many powerful features. Unfortunately, as I mentioned earlier, you will now have to purchase the hardware and software separately.

Commodore Compatibility

The Modem/300 states that it is compatible with the Commodore 64, SX-64, Plus/4 and VIC-20 computers. The Modem/300's terminal software will not work with the VIC, so a simple Basic program is included for use

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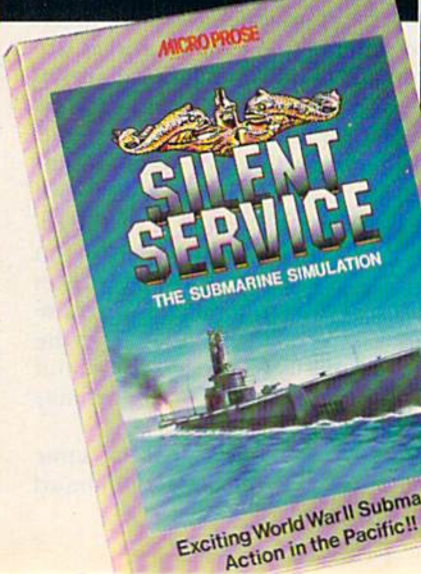
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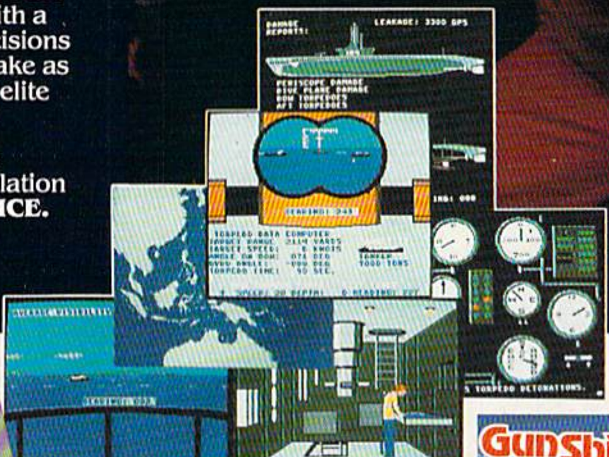
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	Volks 6420	Modem/300 (1660)	MPP 1064	Mitey Mo
Hardware				
Direct connect to phone line	Y	Y	Y	Y
Direct connect to computer	Y	Y	N	Y
All cables included	Y	Y	Y	Y
Standard phone plugs (RJ 11)	Y	Y	Y	Y
Answer/Originate modes	Y	Y	Y	Y
On/off switch	N	N	Y	N
Auto dial: rotary	Y	Y	Y	Y
touch-tone	Y	Y	N	N
detects busy signal	N	N	N	N
Auto answer	Y	Y	Y	Y
Status indicators: power LED	N	N	Y	N
off hook LED	N	N	Y	N
carrier detect LED	N	N	Y	N
speaker	Y	Y	N	N
Software				
Protocols supported: full duplex	Y	Y	Y	Y
half duplex	Y	Y	Y	Y
Punter	N	N	Y	N
XModem	N	N	Y	Y
CBM ASCII to ASCII	Y	Y	Y	Y
Xon/Xoff	Y	Y	Y	Y
Screen size: 40 column	Y	Y	Y	Y
other size via software	N	N	64/80/106	N
other size via hardware	N	N	N	80
User-selectable features: # substitutable characters	0	0	3	255
redefine Xon/Xoff codes	N	N	Y	Y
add line feed to return	Y	Y	Y	Y
Disk functions: selectable device number	N	N	Y	Y
number of functions[1]	0	1	4	7
Memory buffer: editor	N	N	Y	N
maximum size	30K	40K	7K	28K
Programmable function keys: maximum number	0	16	20	4
maximum characters per key	0	28	127	255
Generate break signal	Y	N	Y	Y
File conversions: program to .IMG	Y	N	N	Y
.IMG to program	N	N	N	Y
Basic to text	N	N	Y	Y
text to Basic	Y	Y	Y	Y
Automatic data transfer: dial/log on/upload/hang up	Y	N	N	N
answer/download/hang up	Y	N	Y	Y

[1] Possible disk commands: Directory, Rename, Format, Delete, Validate, Copy and Read Error Message.

A comparative look at the modems mentioned in the article. Details of Commodore's 1670 modem were not available at press time.

with this machine. The MPP, Volks 6420 and Mitey Mo modems do not claim to be compatible with any Commodore computers other than the C-64. I strongly suspect that the modem hardware is compatible with the SX-64, Plus/4 and VIC-20, but the software might not be.

Interpreting the Chart

I have prepared a chart that lists the most prominent features of the hardware and software of the four packages. Keep in mind that the package with the most features may not necessarily be the best for you, because all features are not equally desirable. I recommend that you weigh the various features based on their importance to you and your communications needs.

CBM 1670 Modem

(At the time of publication, Commodore had not yet released the 1670 modem. However, we are able to provide you with a pre-release look at the new 1200-baud modem, courtesy of Harry Flaxman, a SYSOP of Delphi's Flagship Commodore. Contact HARRYF on Delphi.—Eds.)

The Commodore 1670 Modem 1200 is a 300/1200-baud, direct-connect smart modem. It plugs directly into the user port of the C-64 or C-128 without any interface.

In outward appearance, the modem is identical to the 1660 Modem/300, also marketed by Commodore. However, outward appearances aren't everything! Housed inside the 1-inch deep, 2.5-inch-wide by 4-inch-long white plastic case is a radically different modem!

For those of you unfamiliar with a 1200-baud modem, it is usually a combination of two modems in one. First, for low-speed communications, it can operate as a 300-baud modem. It is also a 1200-baud modem for high-speed communications (1200 baud is approximately four times faster than 300 baud). What does this mean to the average telecommunicator?

Well, depending on what you're doing and how much time you spend on a commercial network, the High-Speed mode can help you save on connect charges, since transfer rates are almost four times as fast if you're downloading a lot of files. On the other hand, if you're reading and replying to messages, 300 baud may be the way to go.

The 1670 modem shares the same commands as the Hayes 1200-baud modem. To perform a function, you need only load a terminal and type commands directly to the modem. Hayes-specific commands are preceded by the attention command (AT).

If, for example, you want your modem to dial a phone number using tone dialing, you simply have to type from the terminal:

```
ATDT1234567
```

where 1234567 is the number you'd like to dial. The modem will wait 30 seconds to detect a carrier, and then let you know whether or not it has done so by sending a result code. The result code will appear as one of the following:

```
CONNECT
CONNECT 1200
NO CARRIER
```

The number of rings the modem ignores before answering the phone is adjustable by an AT command. According to the command ATS0 = x (where x is the number of rings from 0 to 255), the modem will answer the phone after that many rings. If you're skeptical about whether your new modem is actually dialing the phone and connecting, listen to the built-in speaker. It automatically turns on when the modem dials and shuts off when a connect occurs or when time expires before a connection is made.

Sending an ATM0 will turn the speaker off completely. ATM1 will turn the speaker to Normal mode, which leaves it on until a connection occurs or time expires. ATM2 turns the speaker on all of the time. The speaker is clear in sound and has no telltale clicking and popping as does the Modem/300.

As the modem is powered up, it defaults to auto-answering the phone on one ring, shuts off echo (you won't see what you type to the modem) and sets result codes. The speaker is set to M1 (on until carrier detect). ATZ resets the modem to power-up default values.

I find the 1670 to be a good alternative to a Hayes or compatible modem. Although the modem can only be used with a Commodore machine, the price is right, predicted to be below $200 at the time of release. I'd rather not have the Answering mode activated on power-up, but many Hayes-compatible modems use that as a standard default setting. The 1670 is a sleekly compact unit, and mine performs flawlessly. Since I received it, my Hayes modem hasn't left the shelf. R

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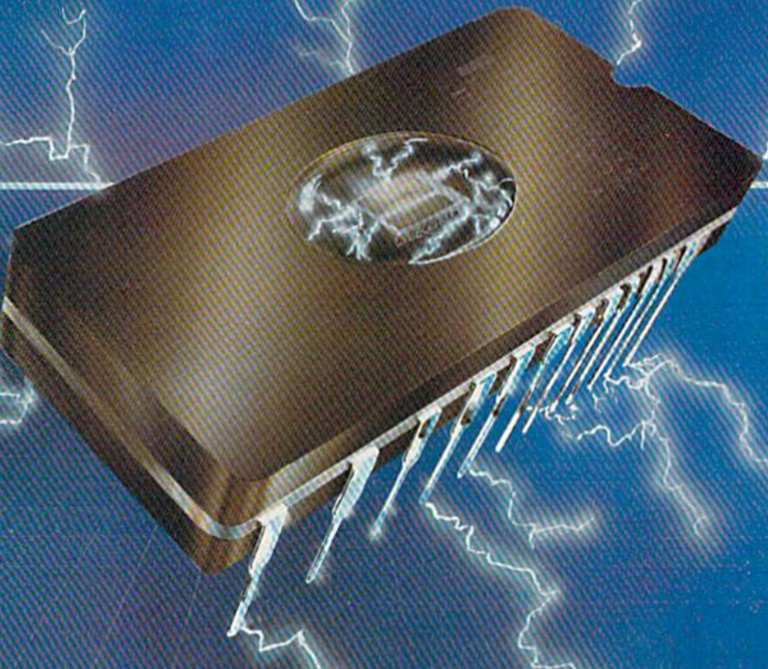

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Hitchhiker's Guide to the Galaxy (INFOCOM)	?	70 sec	70 sec*	**	68 sec*
On-field Football (GAMESTAR)	?	159 sec	66 sec	53 sec	56 sec
EASY FINANCE I (COMMODORE)	?	58 sec	13 sec	13 sec	11 sec

* = Will not fast load — defaulted back to regular load.
** = *Failed to load at all.*

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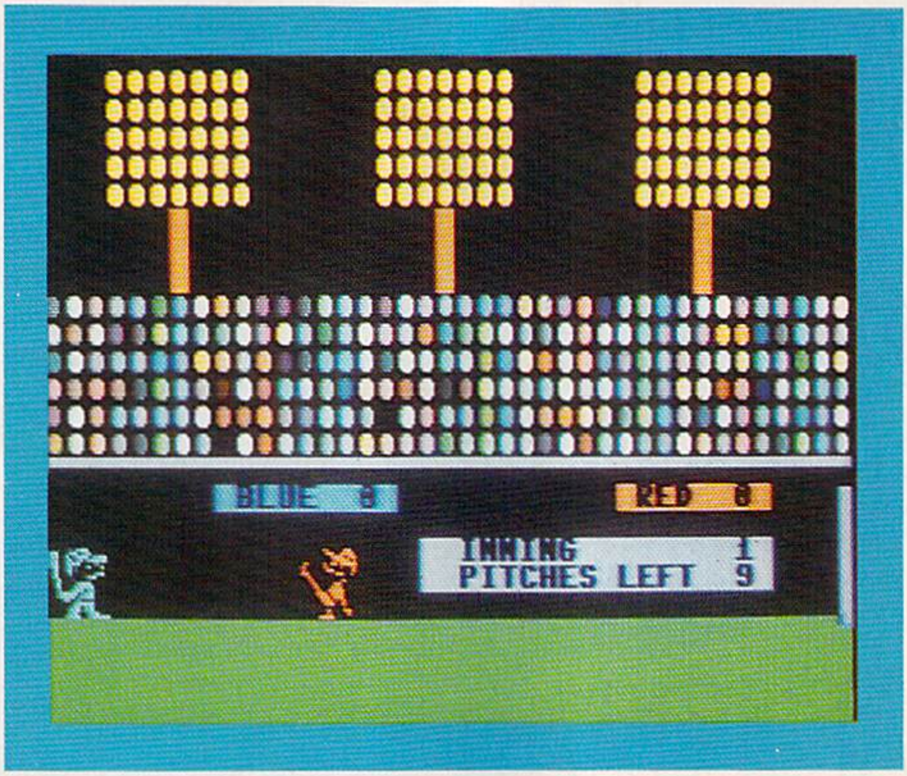

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Once Home Run Derby loads, you will be transported to a colorful, lighted stadium packed with enthusiastic fans. The lights are so bright you can see the ball's shadow following the ball as it heads for the fence.

The concept is simple. In each of the nine innings, you and your opponent get a certain number of pitches; you try to hit as many balls over the fence as you can. If you play alone, you can hit for both sides. To swing, you simply press the fire-button (joystick in port 2). You have the option of allowing the computer to do all the pitching; or, you or your opponent, depending on who's pitching, may control the type of pitch thrown.

If you opt for player-controlled pitching, you'll need to plug a second joystick into port 1. Depending on joystick positions, you have nine pitches available (see Table 1).

To release your pitch, just point the joystick in the proper direction and press the button. By mixing up the pitches, the defensive player can effectively prevent the batter from getting into a "groove." If the computer is controlling the pitches, it will do the mixing automatically.

Hitting the ball over the wall may seem hard at first, but be patient; by the end of one nine-inning game, you'll have the knack—somewhat.

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THE WAY IT WORKS. The X-10 Powerhouse Interface is cable-connected to the Commodore "User" port and plugged into a standard 110V outlet. After it is programmed, the Interface sends digitally encoded signals through your home wiring to special X-10 Modules. To control a lamp or appliance, you simply plug the electrical device into a Module and then plug the Module into an outlet. The Interface can control up to 256 Modules throughout your home and won't interfere with normal use of lights and appliances.

There are plug-in Appliance Modules, Lamp Modules, Wall Switch Replacement Modules and Special 220V Modules for heavy duty appliances such as water heaters and room air conditioners. Plus Thermostat Controllers for central heating and air conditioning, Telephone Responders to control your home from any phone, and much more.

IT WON'T TIE UP YOUR COMPUTER. Use your computer only for programming. When you're finished, disconnect the Interface from the "User" or RS-232 port and keep it plugged into any convenient power outlet in your home. It will operate as a stand-alone controller with battery back-up and will run your home automatically.

SURPRISINGLY INEXPENSIVE. A Powerhouse System including the Interface, software and connecting cables costs less than $150. X-10 Modules are less than $20 each.

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X-10® POWERHOUSE
NUMBER ONE IN HOME CONTROL

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Circle 77 on Reader Service card.

LEFT—straight fastball	RIGHT—Straight slowball
LEFT/UP—rising fastball	RIGHT/UP—rising slowball
LEFT/DOWN—sinking fastball	RIGHT/DOWN—sinking slowball
UP—medium riser	DOWN—medium sinker
NO DIRECTION (fire-button)—medium straight ball	

Table 1. *Pitches available to you in Home Run Derby, according to joystick positions.*

The computer looks for perfect timing. If you swing when the ball is within nine pixels of your strike zone (dead center of batter's body), you'll hit it somewhere. Of course, the closer to dead center, the farther the ball will carry.

Another factor in the ball's carry is the speed of the pitch; just as in real baseball, a blazing fastball is easier to put into the seats than a change-up. (That also ought to keep Goose Gossage-style pitchers from throwing nothing but heat.)

The risers and sinkers are dandy pitches because, if they are out of the strike zone, they will result in nothing better than a foul tip. However, some don't sink or rise quite out of the strike zone, and these are very hittable. Not only that, but if the batter lays off the ones that look too high or too low, an automatic umpire will call balls and strikes. If the pitch is a ball, then it doesn't count against the batter. So, if you can just lay off those forkballs, sliders, knucklers and rising fastballs, you won't lose any of your nine pitches. That, of course, is easier said than done.

The rest of the game is completely self-explanatory, even if you know nothing about baseball. A complete game takes about five minutes, unless you go extra innings.

The game makes use of many of the 64's excellent sound and graphics features, including two-part harmony, sound effects, animated sprites and a smoothly arcing batted ball, with shadow. I used an interrupt routine to create a stylized crowd that seems to be quite involved in the ballgame. All the action is controlled via machine language, so the game plays smoothly.

After you've invested time typing in Home Run Derby, be sure to save it before running it. If you'd rather not type it in yourself, send me $4. I'll supply the disk, a mailer and a copy of the program.

So, enjoy a nice summer evening under the lights playing Home Run Derby. There's a long drive! It's going, going. . . R

Address all author correspondence to Mark Jordan, 70284 C.R. 143, Ligonier IN 46767.

Home Run Derby is available on both the disk and cassette versions of the Fall edition of ReRUN.

Editors

Listing 1. *Home Run Derby program.*

```
10 DIMJ(26),JS(26):FORT=16TO26:READJ(T),JS(
   T):NEXT                          :REM*168
15 POKE53281,5:PRINT"{COMD 7}{SHFT CLR}","{
   CRSR DN}{CTRL 1} CONTROL PITCHES{2 SPACE
   s}Y/N?":JJ=49192:JV=56321          :REM*1
20 GETP$:IFP$=""THEN20              :REM*160
25 POKE53281,0:POKE53280,0:PRINT,"{COMD 8}P
   LEASE WAIT . . ."                 :REM*25
30 X$="{HOME}{17 CRSR DNs}{5 CRSR RTs}{CTRL
    2}":B$=X$+"{CRSR RT}BALL":S$=X$+"STRIKE
   ":BS$=X$+"{CTRL 9}{CTRL 1}{6 SPACEs}"
                                    :REM*140
35 S=54272:FORL=0TO24:POKES+L,0:NEXT
                                    :REM*197
40 V=53248:POKEV+16,128:FORT=0TO7:POKET+204
   0,192+T:NEXT                       :REM*8
45 FORT=12288TO12414:POKET,0:NEXT   :REM*171
50 FORT=12736TO12798STEP3:POKET,252:POKET+1
   ,0:POKET+2,0:NEXT                 :REM*44
55 S3=196:TU=1:X=8:Y=3:GOSUB235:POKEV+39,1:
   POKEV+40,0:POKEV+46,4:POKEV+23,128
                                    :REM*217
60 FORT=1TO5:READA,B:POKEA,B:NEXT:FORT=1TO8
   :READA(T),B(T),C(T),D(T),E(T):NEXT
                                    :REM*180
65 IFG=1THEN80                       :REM*49
70 FORT=12416TO12735:READA:POKET,A:NEXT
                                     :REM*34
75 FORT=49152TO49648:READA:POKET,A:NEXT
                                    :REM*239
80 SYS49478:PRINT"{HOME}";:L$="{CTRL 8}{3 C
   RSR RTs}{7 SHFT Qs}{3 CRSR RTs}":REM*196
85 FORT=1TO3:PRINTL$;:NEXT:PRINT:C=C+1:IFC<
   5THEN85                          :REM*143
90 L$="{6 CRSR RTs}{CTRL 9}{COMD 1} {6 CRSR
    RTs}":K=K+1:IFK<4THEN85         :REM*218
95 PI=9:IN=1:GOSUB330:GOSUB280      :REM*193
100 POKEV+21,155:POKEV+6,25:POKEV+7,189:POK
    EV+14,82:POKEV+15,171:GOSUB310 :REM*246
105 POKEV+8,120:POKEV+9,189:POKE2043,194:PO
    KE2044,S3                       :REM*111
110 YY=0:XY=RND(0)*30+1:YX=RND(0)*3+2:IFYX<
    3THENYY=XY                      :REM*168
115 PY=1:IFP$="N"THENPY=0:GOTO130   :REM*199
120 J1=31-(PEEK(JV)AND31):IFJ1<16THEN120
                                    :REM*136
125 YX=JS(J1):POKE780,J(J1):JJ=49195:REM*31
130 PRINTBS$:S3=S3+1:FORT=1TO300:NEXT
                                     :REM*22
135 POKE2044,S3:IFS3<198THEN130      :REM*79
140 POKEV,120:POKEV+1,200:POKEV+31,0:POKEV+
    2,120:POKEV+3,215                :REM*42
145 POKE49406,192:POKE49663,1:POKEV+16,128:
    POKE2,YX:POKE49230,PZANDPY:SYS JJ
                                     :REM*87
150 A=PEEK(V+1):X=ABS(37-(PEEK(V))):IFPEEK(
    2043)=195THEN165                :REM*154
155 IFA<198ORA>202THENPI=PI+1:PRINTB$:GOTO1
    85                               :REM*19
160 PRINTS$:GOTO185                 :REM*198
165 IFX>9THEN185                    :REM*253
170 IFA<198ORA>202THENSYS49547:GOTO185
                                     :REM*48
175 X=19-X*2-YX:IFX<1THENX=1         :REM*37
180 GOSUB190:POKE2044,196:SYS49274 :REM*232
185 GOSUB195:S3=196:GOTO100          :REM*73
190 POKE251,X+YY:POKE254,X:RETURN    :REM*84
195 IFTU=-1THEN210                   :REM*19
200 X=8:Y=3:GOSUB235:IFPEEK(V+16)=131ANDPEE
    K(V)>85THENBL=BL+1              :REM*102
205 GOTO215                          :REM*63
210 X=3:Y=8:GOSUB235:IFPEEK(V+16)=131ANDPEE
    K(V)>85THENRE=RE+1               :REM*70
215 IFPI>1THEN230                   :REM*201
220 TU=-TU:JV=JV+TU:PZ=PZ-TU:IFTU=1THENIN=I
    N+1:GOSUB330:IFIN>9THENGOSUB240:REM*128
```

→

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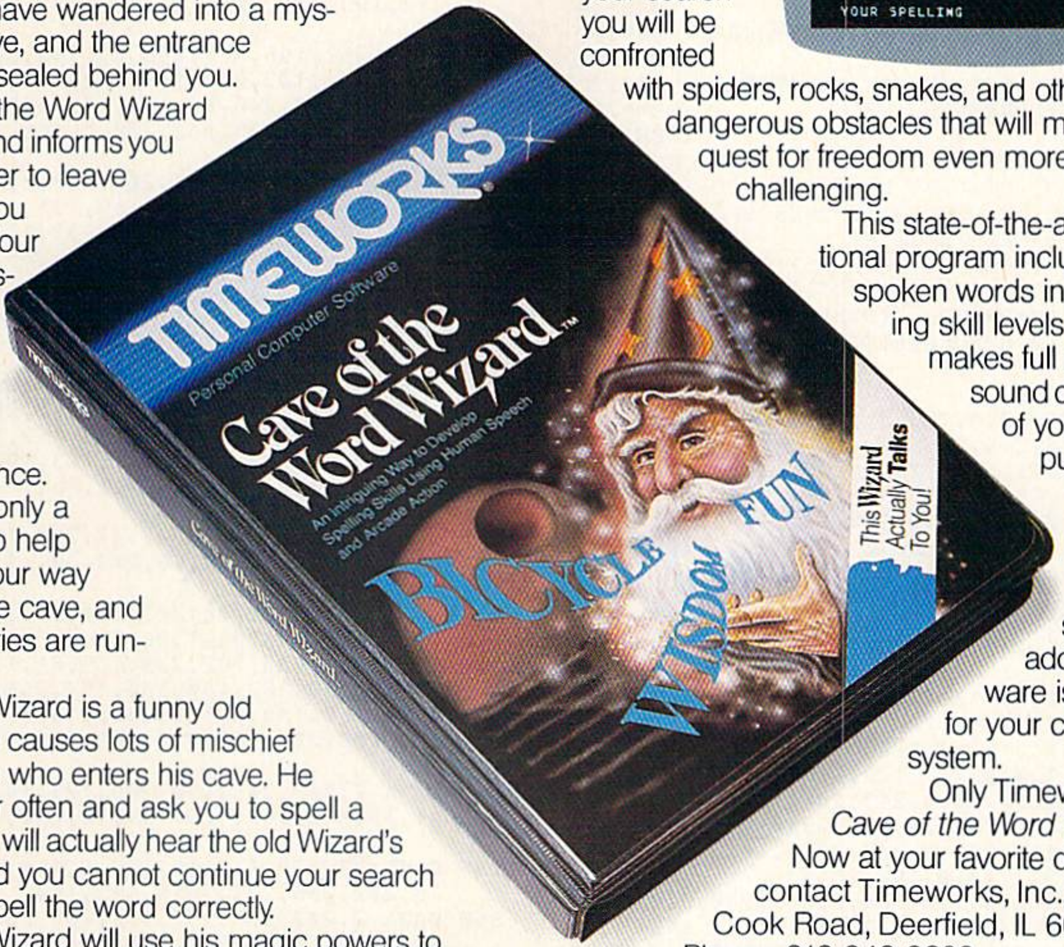
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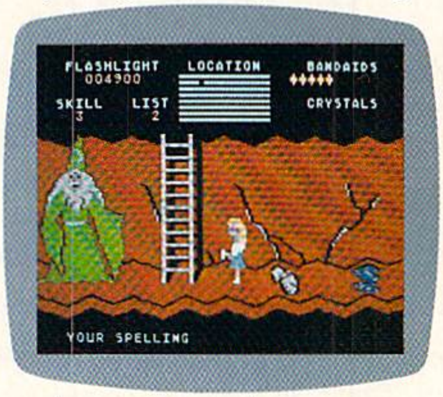
The Wizard will use his magic powers to replenish the energy in your flashlight if you spell the word correctly, but each time you are wrong he will draw energy from your light. When your flashlight runs out of energy you will be doomed to roam through the cave in darkness forever.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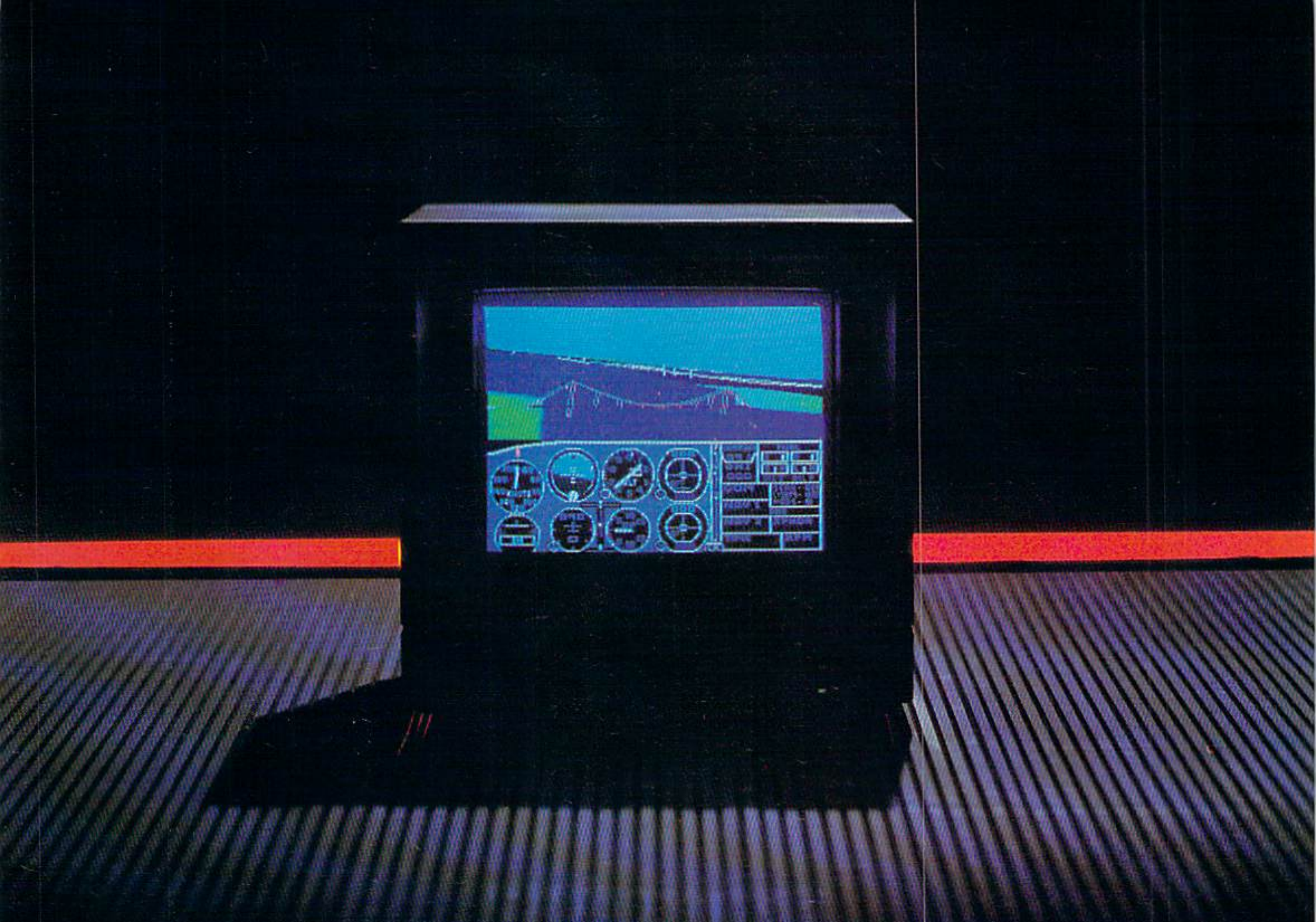
Listing 1 continued.

```
225 GOSUB230:PI=10:GOSUB280:POKEV,0:POKEV+1
    ,0:POKEV+3,0:GOTO195            :REM*201
230 PI=PI-1:GOSUB330:RETURN          :REM*86
235 FORT=43TO45:POKEV+T,X:NEXT:POKEV+41,Y:P
    OKEV+42,Y:RETURN                :REM*177
240 IFRE=BLTHENRETURN               :REM*214
245 FORT=55296TOT+240:POKET,0:NEXT :REM*209
250 WI$="BLUE":IFRE>BETHENWI$="RED":REM*252
255 PRINT"{HOME}{3 CRSR DNs}{CTRL 8}{CTRL 9
    }","{2 SPACEs}NICE GAME, "WI$"{2 SPACEs
    }"                              :REM*213
260 PRINT"{2 CRSR DNs}"," PLAY AGAIN?{2 SPA
    CEs}Y/N":POKE198,0                :REM*7
265 GETA$:IFA$=""THEN265            :REM*178
270 IFA$<>"N"THENCLR:RESTORE:G=1:GOTO10
                                     :REM*91
275 END                              :REM*22
280 POKES+5,35:POKES+6,247:POKES+24,15
                                     :REM*25
285 POKES+12,35 :POKES+13,247        :REM*86
290 FORT=1TO8:POKES,B(T):POKES+1,A(T):POKES
    +7,D(T):POKES+8,C(T)             :REM*83
295 POKES+4,17:POKES+11,17          :REM*106
300 FORI=1TOE(T)*50:NEXT            :REM*159
305 POKES+4,16:POKES+11,16:FORI=1TO50:NEXT:
    NEXT                            :REM*114
310 POKES+5,192:POKES+6, 64+7:POKES+1,6:POK
    ES,59:POKES+4,128                :REM*49
315 POKES+19,15:POKES+20,248:POKES+14,99:PO
    KES+15,159                      :REM*132
320 POKES+12,15:POKES+13,247:POKES+7,128:PO
    KES+8,8:POKES+18,128            :REM*205
325 RETURN                          :REM*128
330 PRINT"{HOME}{15 CRSR DNs}","{2 CRSR LFs
    }{CTRL 9}{CTRL 7} BLUE{4 SPACEs}{3 CRSR
     LFs}"BL,,"{CTRL 3}{2 CRSR LFs} RED{4 S
    PACEs}{3 CRSR LFs}"RE           :REM*195
335 PRINT,,"{CRSR DN}{CTRL 5}{CTRL 9}{2 CRS
    R LFs}{2 SPACEs}INNING{10 SPACEs}{3 CRS
    R LFs}"IN:PRINT,,"{CTRL 5}{CTRL 9}{2 CR
    SR LFs}{2 SPACEs}PITCHES LEFT{4 SPACEs}
    {3 CRSR LFs}"PI                  :REM*94
340 RETURN                          :REM*143
345 DATA 99,3,0,3,255,3,,,99,2,0,2,255,2,,,
    99,4,0,5,255,5                   :REM*80
350 DATA 12361,124,12364,248,12288,112,1229
    1,240,12294,224                 :REM*101
355 DATA 0,0,0,0,0,16,195,12,143,6,33,135,2
    5,30,2,28,49,22,96,2            :REM*246
360 DATA 25,30,21,31,2,21,31,16,195,2,25,30
    ,21,31,8,18,209,15,210,16       :REM*253
365 DATA 40,190,0,241,239,0,243,126,252,243
    ,187,252,243,240,96,243,163,24,115
                                    :REM*236
370 DATA 160,8,113,128,120,112,131,192,56,6
    5,0,56,63,0,56,127,128,24,251   :REM*125
375 DATA 128,31,239,128,31,223,128,7,50,128
    ,0,127,128,0,247,128,1,247,128   :REM*48
380 DATA 1,227,224,3,243,254,168,0,254,7,1,
    223,7,3,119,191,3,126,255       :REM*135
385 DATA 3,187,239,3,240,30,3,147,14,1,128,
    124,1,131,220,0,193,28,0        :REM*232
390 DATA 63,56,0,127,184,0,255,240,0,255,22
    4,0,255,224,0,114,128,0,127     :REM*197
395 DATA 128,0,125,128,0,251,128,0,243,224,
    1,243,248,168,0,252,0,1,254     :REM*198
400 DATA 0,3,255,0,2,223,0,255,251,0,255,25
    5,128,2,7,128,14,231,128        :REM*229
405 DATA 8,7,128,110,224,128,63,192,128,4,1
    ,0,3,254,0,0,62,128,0           :REM*150
410 DATA 31,196,0,15,238,0,15,254,0,9,62,0,
    15,244,0,3,240,0,31              :REM*45
415 DATA 252,168,0,56,60,0,30,126,0,7,239,0
    ,3,251,56,55,127,112,56          :REM*80
420 DATA 103,112,30,39,120,5,230,28,4,8,14,
    2,112,7,3,192,3,135,192          :REM*47
425 DATA 1,207,224,1,247,224,0,251,224,0,12
    5,112,0,62,112,0,20,48,0         :REM*52
430 DATA 28,60,0,28,28,0,254,0,0,0,0,0,0,0,
    0,0,0,0,1                        :REM*69
435 DATA 240,0,3,252,0,7,254,0,7,255,0,3,12
    7,128,15,207,128,63,15          :REM*118
440 DATA 128,2,97,192,3,190,96,0,127,120,0,
    255,188,1,231,190,3,143,127     :REM*233
445 DATA 7,13,183,14,24,255,28,57,254,28,33
    ,239,0,7,63,233                 :REM*186
450 DATA 120,169,13,141,20,3,169,192,141,21
    ,3,88,96,162,31,234,173,27      :REM*155
455 DATA 212,201,240,176,249,168,173,27,212
    ,41,15,153,64,217,234,202,208,236
                                     :REM*60
460 DATA 76,49,234,234,173,27,212,201,64,14
    4,12,201,192,176,16,169,0,141   :REM*119
465 DATA 88,192,76,77,192,169,206,141,91,19
    2,76,72,192,169,238,141,91,192 :REM*112
470 DATA 169,8,141,88,192,173,0,220,41,16,2
    40,32,173,27,212,201,8,176      :REM*159
475 DATA 3,238,1,208,206,0,208,206,2,208,17
    3,0,208,240,16,164,2,202        :REM*122
480 DATA 208,253,136,208,250,76,77,192,169,
    195,32,193,193,96,169,143,141,253
                                    :REM*109
485 DATA 192,169,16,141,163,192,169,38,141,
    156,192,169,206,141,182,192,234,198
                                     :REM*82
490 DATA 251,165,251,208,23,198,80,165,80,2
    08,13,24,102,253,165,253,133,80:REM*113
495 DATA 201,0,240,89,133,252,165,254,133,2
    51,198,252,165,252,208,7,165,253
                                    :REM*208
500 DATA 133,252,238,1,208,238,2,208,238,0,
    208,173,0,208,208,5,169,131      :REM*23
505 DATA 141,16,208,32,159,193,173,255,193,
    240,42,173,30,208,201,129,208,36
                                    :REM*192
510 DATA 169,17,141,11,212,238,1,208,32,184
    ,193,169,16,141,11,212,206,2    :REM*201
515 DATA 208,206,0,208,173,1,208,205,3,208,
    208,231,234,234,234,234,234,96 :REM*125
520 DATA 76,143,192,173,182,192,201,238,240
    ,28,169,8,133,80,133,253,169,16:REM*116
525 DATA 133,251,169,0,141,163,192,169,102,
    141,156,192,169,238,141,182,192,76
                                     :REM*27
530 DATA 143,192,169,34,141,253,192,169,193
    ,141,254,192,173,16,208,201,131,208
                                    :REM*204
535 DATA 7,173,0,208,201,240,176,8,173,1,20
    8,205,3,208,208,1,96,76          :REM*45
540 DATA 233,193,162,240,169,81,157,63,5,20
    2,208,250,162,160,138,157,255,3:REM*116
545 DATA 157,159,4,157,255,215,157,159,216,
    202,208,241,162,200,169,160,157,31
                                    :REM*181
550 DATA 7,202,208,250,169,128,141,27,212,1
    41,15,212,169,129,141,18,212,162
                                    :REM*188
555 DATA 40,169,120,157,47,6,169,4,157,47,2
    18,202,208,243,76,0,192,164      :REM*61
560 DATA 2,202,208,253,136,208,250,206,0,20
    8,206,2,208,173,2,208,208,237    :REM*74
565 DATA 96,173,16,208,201,131,208,18,173,0
    ,208,201,96,144,6,169,0,141     :REM*197
570 DATA 255,193,96,169,1,141,255,193,160,6
    ,202,208,253,136,208,250,96,141 :REM*50
575 DATA 251,7,173,0,208,201,47,176,4,201,2
    8,176,4,32,139,193,96,169       :REM*243
580 DATA 1,133,253,133,252,133,80,169,129,1
    41,4,212,141,18,212,169,128,141:REM*164
585 DATA 18,212,96,169,128,141,4,212,76,182
    ,192                            :REM*153
```



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This disk has over 100 routines, some of them are routines for protection, smooth scrolling, modem routines, and sound and color routines: bootmaker, paddle and joystick; read terminal, auto dial, auto answer. They can easily be incorporated into all of your programs. It is also fully documented. With this disk alone you could build your own program. This disk has a lot of tricks that are used in commercial software.

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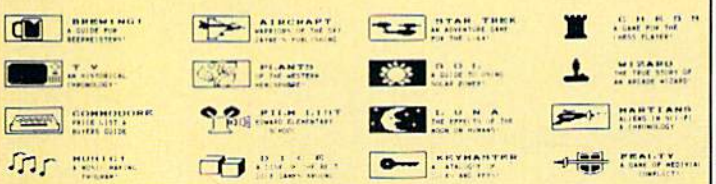

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Programed by Jim Drew

MAGNUM LOAD is a new replacement KERNAL (operating system) ROM chip for your Commodor 65 or 128 computer that will load and verify programs up to 6 times faster than before. The tape routines have been removed from the old chip and in their place have been put a high-speed loader, high-speed verify, and disk driver no-head-rattle routine. Unlike the older cartridge fast loaders, no ports are tied up at the rear of the computer, the screen is not blanked during loading and there is no wear-and-tear on the expansion port. For maximum convenience and performance, the chip is installed directly in the circuit board. Generally a socket has already been provided to make the operation easy, but occasionally some soldering may be required. Now you can give your 1541 disk drive "1571 speed."

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Program	Star-Dos	Reg. Load	Mach 5	Fast Load	MAGNUM LOAD
Pitstop II	?	144 sec.	43 sec.	41 sec.	**31 sec.**
Music Shop	?	105 sec.	105 sec.*	105*	**21 sec.**
Hitchhiker's Guide to the Galaxy	?	70 sec.	70 sec.*	N.G.**	**68 sec.**
On-field Football	?	149 sec.	66 sec.	63 sec.	**56 sec.**
EASY FINANCE I	?	58 sec.	13 sec.	13 sec.	**11 sec.**

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*Will not fast load - defaulted back to regular load

**Failed to load at all

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C-64 Book Only	$\$19^{95}$ US
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This manual does not condone piracy

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Track Trap disk expanded manual	$\$9^{95}$ US

Top Secret Stuff I and Top Secret Stuff II

Programed by Jim Drew

Are both collections of 20 programs per diskette (that works out to about $1.00 per program!) that help you explore and enhance your Commodore 64 and/or 128 and 1541 disk drive. Now you can unlock many secrets formerly known only to top machine language programmers by using these sophisticated "tools." If you have ever been curious about the inner workings of your computer system, now is your chance to dig in and find answers with the help of these programs. These collections of programs have gotten rave reviews from actual users, and we are sure that you, too, will be pleased.

The programs include on each diskette are listed below

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The Dock (view/repair disk contents)
Sync Checker (diskette)
Imbedded Track Number Creator
Disk Manipulation System
3 Minute Copy (backup program)
Diskette Matcher (compare sectors)
Unscratch A File (recover file)
View BAM (block allocation map)
1541 Read/Write Test
½ Track Reader
Header Reader (display disk header)
Sync Maker
Device Number Change (disk drive)
Electronic Arts Backup
Drive Mon (disk drive m/1 monitor)
Diskette File Log (start-end address)
Write-Protect Sensor Test
Repair A Track (recover data)
Fast Format (10 seconds)
½ Track Formatter

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TOP SECRET STUFF II

RAM Test (test Computer RAM)
Copy $AOOO-$FFFF (under ROMS)
Display G.C.R. (All sector data)
Un-Write Protect (diskette)
Unnew Program
Wedge - $8000
Smooth Scroll (messages up screen)
Koala Dump (koala pad screen dump)
Disk Manipulation System
Disk Eraser (20 second clean wipe)
Split Screen (TWO screen colors)
Disk Protection System (stops copies)
Write Protect (diskette)
Boot Maker (autobook BASIC programs)
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3. **Save Numbers** will save numbers where a computer answered.
4. **Hardcopy of Numbers** will print out list of numbers where a computer answered.
5. **LOAD Numbers** will load in numbers to continue where it left off.
6. **Continue** will pick up dialing where it was interrupted.

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RUN's Great Communicator—

Runterm Plus

Here's Part 1 of a professional-quality terminal program that you can easily enter and use for telecommunicating with your Commodore.

By ROBERT SIMS

Runterm Plus is a full-featured terminal program that will communicate with any computer that uses either standard ASCII or Commodore ASCII data format. The program can transfer files by capture buffer, as well as by automatic protocols, which ensure error-free transmission. It also has one feature that lets you view high-resolution graphics and another that lets you play games through your modem.

Because the machine code for Runterm Plus is over 14,000 bytes, *RUN* will be publishing the program in two parts. However, you won't have to wait another month to use the program.

This month's article, Part 1, provides you with a CBM ASCII terminal program that operates in half-duplex, with the capability of uploading and downloading text files through the buffer. With this setting, you can call any Commodore computer that's running a CBM ASCII terminal program in half-duplex.

This program is set up to work with the VIC-Modem, the 1650 Auto-Modem and other modems that are compatible with these. Next month, you'll get Pokes to make the program work with Mitey Mo and HESModem II.

Part 2, which will appear in the January issue of *RUN*, includes the automatic file-transfer routines and the modem game features, as well as the standard ASCII and full-duplex capability that you'll need to call the national networks. You will be able to upload and download program files with this part.

Because Runterm Plus is written entirely in machine language, you can't enter it in the same way you'd enter a Basic program. I have written a special program, ML Perfect Typist (p. 50 in this issue), that will help you enter Runterm Plus without worrying about typing errors.

Use ML Perfect Typist to enter Part 1 of Runterm Plus, then save it to disk as an incomplete program under the name RUNTERM PLUS. You will be using this program next month when you enter Part 2. Before you use the program, clear your com-

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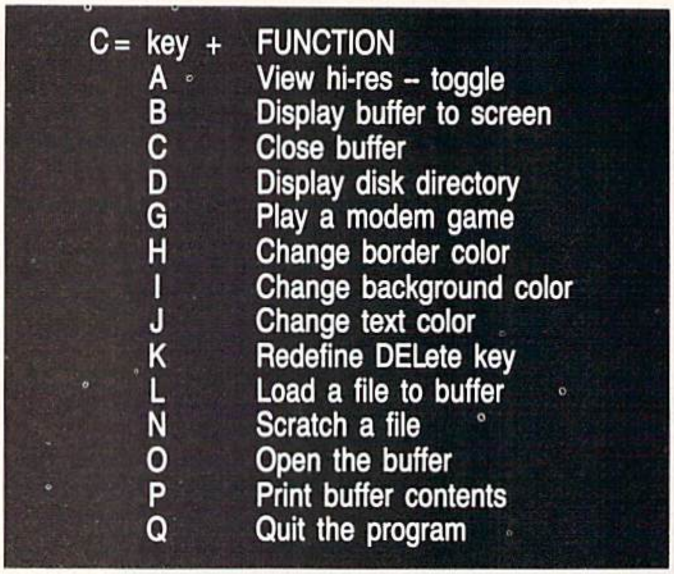
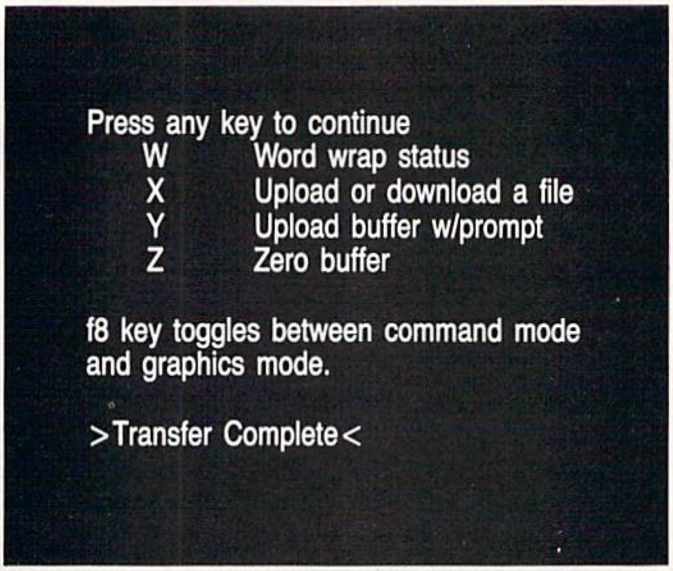


```
C= key +  FUNCTION
      A   View hi-res -- toggle
      B   Display buffer to screen
      C   Close buffer
      D   Display disk directory
      G   Play a modem game
      H   Change border color
      I   Change background color
      J   Change text color
      K   Redefine DELete key
      L   Load a file to buffer
      N   Scratch a file
      O   Open the buffer
      P   Print buffer contents
      Q   Quit the program
```



```
Press any key to continue
     W         Word wrap status
     X         Upload or download a file
     Y         Upload buffer w/prompt
     Z         Zero buffer

f8 key toggles between command mode
and graphics mode.

>Transfer Complete<
```

puter by entering SYS64738; then load Part 1 back into your computer, using:

```
LOAD"RUNTERM PLUS",8,1
```

and set that disk aside; don't use it again until you type in part 2 next month. Insert another disk into the drive and enter the following Pokes:

```
POKE 2049,11
POKE 2050,8
POKE 2051,10
POKE 2052,0
POKE 2053,158
POKE 2054,50
POKE 2055,53
POKE 2056,57
POKE 2057,52
POKE 2058,0
POKE 2059,0
POKE 2060,0
```

Then save this to your new disk, using:

```
SAVE"RUNTERM PLUS.1",8
```

or another filename of your choice.

These Pokes set up Part 1 of Runterm Plus so you can load and save it to disk just as you do a Basic program.

In Part 2, you'll learn to set up the complete program in the same way.

To use Runterm Plus, insert the disk into your drive. If you are using the VIC-Modem, set it for Originate. For the Commodore 1650 Auto-Modem or compatibles, set the modem for Originate and Telephone (Voice). Then enter:

```
LOAD"RUNTERM PLUS.1",8
```

and press the return key. When the load is finished, type RUN and hit the return key; you'll see the opening screen. Pressing CMD-M will display the menu of features available. When you're ready to go on-line, switch the modem (except the VIC-Modem) to Data.

Control Codes

National services and some local bulletin boards require that you enter a log-on code, which tells the host computer that you are ready to go. CompuServe, for example, waits for a Control-C (ASCII3) or a Return. If you are calling Delphi via Tymnet, you'll be asked to enter your terminal identifier (you type A).

In addition to the log-on code, you will need to send and receive other special control codes. The most common codes are composed of the first 27 characters in the ASCII character set—Control-A through Control-Z and Escape.

To generate these codes with Runterm Plus, hold down the CTRL key and press the appropriate key. CTRL-A sends a binary 1, CTRL-T (or the delete key) sends a binary 20, and so on. To send the escape character, hold down the CTRL and press the colon key. (ESC is often used on CompuServe.)

You should also be aware that if you press the home key, a CTRL-S (pause) is sent to the other computer. If you hit this key accidentally, then you should send a CTRL-Q (press the cursor-down key) to resume transmission. Pressing the run/stop key will send a CTRL-C, which is used as a cancel code on many systems.

Other Special Keys

In the process of communicating with another computer, you will need to perform several auxiliary operations, such as checking the disk directory, capturing data in a buffer and saving it to disk, or preparing to receive a file. These operations are performed using local commands, generated via a combination of the Commodore logo key and letter keys.

For example, you can read the disk directory by holding down the Commodore logo key and pressing the D key. As it does for all local commands, Runterm Plus sends a CTRL-S (ASCII 19) to the other computer; this puts it on hold, so incoming data won't get mixed into the directory contents. The program then retrieves the disk directory and displays it to the screen.

When the last byte of the directory is displayed, Runterm Plus sends the other computer a CTRL-Q, telling it to resume transmission. All this is done automatically, so you needn't worry about it; I'm telling you this for your information only.

There are two more disk-maintenance commands—Logo-N and Logo-R. Use Logo-N to scratch a disk file. Simply type in the name of the file to be scratched, and Runterm Plus will remove it from the directory. Logo-R is used to rename a file. At the filename prompt, enter the change in this format:

```
newname = oldname
```

and hit the return key.

To see a menu of these local commands and the keys that generate them, hold down the Commodore logo key and Press M when Runterm Plus is running.

Buffer Commands

The Logo-O combination opens the 29K capture buffer; Logo-C closes it; and Logo-Z resets the pointers to the beginning of the buffer.

To capture characters, you must first open the buffer by pressing

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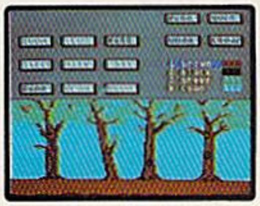
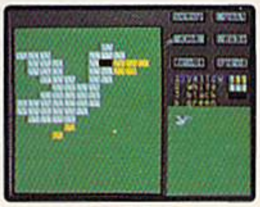

SceneMaker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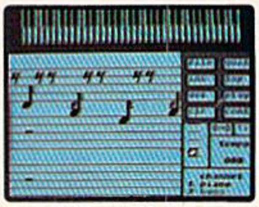
SoundMaker


MusicMaker

The Editor

"(GameMaker is)... designed for everyone who has ever wanted to build his own computer game, but never had the time to learn assembly language."

—Ric Manning/Louisville Times

There's no question! Now is the time to turn that great game idea of yours into a real piece of computer software. With GameMaker, Garry Kitchen brings you the single most powerful computer game design tool ever offered. But he didn't stop with just power. He put all the tools of his trade together and then made them more accessible than ever before for owners of the Commodore 64/128 and the Apple II series computers. GameMaker includes these incredible tools:

SceneMaker. Create the background scenes for your game. Either use scenes that have been pre-programmed or create scenes of your own.

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The Editor. This is where you bring together all the components you created with SceneMaker, SpriteMaker, SoundMaker, and MusicMaker. All the commands needed to make a game program are listed for you. Just choose the ones you want to use, put them in order, and presto! Your new game is off and running.

The Design Contest.

If you've always thought you had some great ideas for games (and you know you have), there's never been a better time or a better way to get them on a disk. Because you can enter the GameMaker Design Contest, and, if your game is judged to be the best, we'll publish it! And that will make you a published software designer. Has a nice ring to it, doesn't it? Published... Software... Designer. Design the most exciting and creative computer game you can imagine and send it to us. All the rules and information for this unique contest are in specially-marked GameMaker packages. Gentlemen—and ladies—start your minds.

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GameMaker

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Logo-O. When it's full (about 117 blocks), you will see a Buffer Full message mixed in with the incoming characters. Any further data that's transferred will appear on the screen, but will not be captured.

Logo-B allows you to view the buffer contents on screen, and Logo-P will send the buffer contents to the printer, stripping out screen codes and control codes that your printer can't handle. You can abort either of these operations by pressing CTRL-X. (It may take the program a few seconds to acknowledge your command and stop the operation.) For faster results, hold down both the CTRL key and X until the abort is accomplished.

Two commands allow you to save the buffer contents to disk. Logo-U will save into a disk file all characters in the buffer. The program will ask you to supply the filename and filetype (program or sequential). Logo-S also saves buffer contents, but edits out screen codes and control codes so the saved file can be printed later.

The program handles all characters as Commodore ASCII. If you are calling a standard ASCII database, characters are translated to standard ASCII as they are sent. Incoming characters are converted to Commodore ASCII before they are stored. This means that all text will be in a format compatible with your computer, so you don't have to concern yourself with conversions.

File and Buffer Transfers

There are three ways of transferring files with Runterm Plus. The first involves loading the file from disk to the program's buffer area and uploading the data from there. (You cannot perform program transfers with Part 1, but only text file transfers from the buffer.)

Second, using the XModem protocol, you can transfer files directly to and from your disk. Again, there is no need for conversion; programs transferred by XModem are ready to run when the transfer is done.

The third means of file transfer is via the Bozart transfer protocols. XModem and Bozart protocol transfers will be discussed in detail in next month's article.

If you wish to upload via the buffer, use the Logo-L command to load the file into the buffer—it will be loaded over anything that was there before.

To transfer the buffer contents to the other computer, you have two choices: Logo-V or Logo-Y. Logo-V will send the entire buffer contents without pause.

Logo-Y will ask you to enter a prompt character. The routine will then upload each line of the buffer, pausing after it sends each carriage return. During the pause, Runterm Plus examines incoming characters for the designated prompt character, which signals that the other computer is ready to receive the next line.

This transfer method is specially designed so you can upload messages from your disk to bulletin board systems. Generally, you can compose a message on your word processor and store it to disk as a CBM ASCII text file. Then, when you're on-line and want to send your message to the bulletin board, load the file using Logo-L and, when the BBS tells you to enter your message, press Logo-Y and supply the prompt character. Runterm Plus will then send the message contents automatically.

To use Logo-Y, you must, of course, know the prompt character being sent by the other computer. In most cases, this prompt character will be the last character in a menu or a start-of-line marker. Before using the Logo-Y command, try to notice which prompt character is being used.

On CompuServe, the prompt is usually a greater-than (>) or a colon (:). On Delphi, the prompt is usually a linefeed (you type CTRL-J when asked to supply the prompt) sent after a carriage return. Other systems simply send the return without a linefeed. If you don't see an obvious prompt character, try the linefeed or carriage return. Better yet, check the service's documentation or ask the SYSOP.

When you initiate either of these uploads, you'll be told that the upload is in process. When the upload is finished, the cursor will return and you'll be told that the transfer is complete. You can abort these uploads by entering CTRL-X.

Screen Commands and Word Wrap

Three commands—Logo-H, Logo-I and Logo-J—change the border, background and text colors, respectively. If you are using Commodore ASCII, then you can also use the regular key combinations to change text color, just as you do when the C-64 is in Immediate mode.

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Since the C-64 has a 40-column screen, and most telecommunication services use an 80-column format, you'll often find that incoming data will wrap around the screen, leaving the first part of a word dangling on the end of the previous screen line. If this irritates you or makes the words hard to read, then you need Logo-W.

When Runterm Plus boots up, the Logo-W routine is set to eliminate word wrap. The screen is formatted for 40 columns. Broken words are erased from the previous line and moved to the next line for ease of reading.

However, there are times—typing in messages, for example—when you want to use 80-column format to keep up with spacing and the number of characters in a line. To turn off the justification routine, just type Logo-W. Each time you do this, the program will toggle and tell you its current status.

Some services—Delphi is one—have automatic word wrap. When using such services, you may want to set Runterm Plus to 80-column format (allow word wrap) so that the two justification features will not work against one another.

Graphics and Logo Commands

While the C-64's function keys are handy, there aren't enough of them. That's why Runterm Plus uses the logo key command format. As long as you're communicating with another computer that's using standard ASCII, there's no conflict. If, however, you are using Commodore ASCII and want to send the graphics characters represented by the logo and letter key combination, you must use the f8 key to leave Command mode and enter Graphics mode.

The f8 key is a toggle that switches the program between two states. When Runterm Plus is booted, it is in Command mode. This means you can use the logo key to generate local commands. If you are using Commodore ASCII and wish to send graphics characters, then just hit f8 to go into graphics mode: hit it again when you need to use commands. Each time you toggle with f8, the program tells you which mode you have selected.

Logo-Q is used to end the program cleanly. If you hit it by mistake, the program allows you to change your mind.

In Part 2, I'll document the remaining commands and discuss how you can use Runterm Plus to upload and download files on local bulletin boards and national networks.

If you don't feel like typing, and want a disk copy of the complete machine code for Runterm Plus, send me $6, specifying that you want Runterm Plus, and I'll send you a copy.

Address all author correspondence to Robert Sims, 7818 Summerfield Road, Summerfield, NC 27358.

Listing 1. *Runterm Plus program.*

```
0001 22 0A A5 01 29 FE 85 01 20 E7 FF 86 04
0002 20 2C 1C A2 21 86 37 A0 0A 84 38 50 03
0003 18 20 99 FF 20 90 16 A2 00 8E 4F 18 04
0004 26 A2 1D 86 FB A2 41 86 FC AC 4F CA 05
0005 26 A9 00 91 FB 20 2F 1E A6 FC E0 4F 05
0006 42 90 F0 AE 4F 26 E0 72 90 E9 20 D6 05
0007 2C 1C A9 0E 8D 20 D0 A9 01 8D 21 DB 03
0008 D0 A2 00 8E DC 41 A9 EB 8D 19 1C 7B 05
0009 A9 20 8D 1A 1C 20 0A 1C AE 50 26 FF 02
0010 E0 01 F0 03 4C 57 0B A9 15 85 FB CA 04
0011 A9 3F 85 FC A0 00 8C 4F 26 AC 4F 10 05
0012 26 B1 FB 8D AF 41 20 D2 FF 20 2F 9B 05
0013 1E AD AF 41 C9 00 D0 EB A9 20 20 35 05
0014 D2 FF 20 D2 FF 20 D2 FF 20 4A 1C 47 06
0015 A2 00 8E 3D 41 20 30 18 AD AF 41 C2 03
0016 C9 31 90 F6 C9 37 B0 F2 A2 00 8E 62 06
0017 1C 42 C9 31 D0 08 A2 01 8E 1D 42 D1 03
0018 4C F5 0A C9 32 F0 13 C9 33 F0 36 7D 05
0019 C9 34 F0 47 C9 35 F0 69 C9 36 F0 8D 06
0020 57 4C BF 0A 20 AC 1E A2 00 8E 11 AB 03
0021 42 8E 3C 41 A2 03 8E 3B 41 A2 7F 32 04
0022 8E 3A 41 AE 1D 42 E0 01 D0 05 A9 8B 04
0023 14 8D 3A 41 4C 6E 0B 4C 6E 0B 20 DD 02
0024 AC 1E A2 01 8E 3C 41 A2 00 8E 11 D1 03
0025 42 A2 02 8E 3B 41 4C 6E 0B 20 AC 9A 03
0026 1E A2 00 8E 11 42 8E 3C 41 A2 03 6B 03
0027 8E 3B 41 A2 7F 8E 3A 41 4C 6E 0B 14 04
0028 20 2C 1C 20 7D 26 A2 00 8E 11 42 CA 02
0029 4C 6E 0B A9 06 8D 93 02 A9 10 8D F9 03
0030 94 02 A2 01 8E 3C 41 8E 0F 42 A2 E3 03
0031 02 8E 3B 41 AE 56 26 E0 26 D0 2E 59 04
0032 A9 22 8D 19 1C A9 26 8D 1A 1C 20 5F 03
0033 0A 1C 20 58 1B AD AF 41 20 D2 FF 68 04
0034 C9 41 F0 07 C9 4F F0 0B 4C 6E 0B FB 04
0035 A9 40 8D 57 26 4C A3 0B A9 02 8D 48 04
0036 57 26 20 29 1D AD 54 26 8D 03 DD 9B 03
0037 AD 54 26 8D 03 DD AD 57 26 8D 01 71 04
0038 DD AD 56 26 8D 03 DD AD 57 26 8D 50 05
0039 01 DD AD 56 26 8D 03 DD AD 57 26 C5 04
0040 8D 01 DD 20 1C 1D AE 50 26 E0 01 F1 03
0041 D0 03 20 2C 1C A2 00 8E 1D 41 4C 3E 03
0042 C7 10 20 29 0F A2 01 8E 10 42 A2 7E 03
0043 00 8E 50 41 20 CC FF 20 E4 FF 8D C5 05
0044 AF 41 C9 00 D0 03 4C 6A 0C A2 01 1D 04
0045 8E 50 41 AD AF 41 8D AF 41 C9 13 42 05
0046 F0 07 C9 11 F0 0C 4C 2A 0C 20 07 A4 03
0047 16 20 48 0F 4C E5 0B 20 18 16 20 66 02
0048 48 0F 4C E5 0B AD AF 41 C9 A1 90 5A 05
0049 36 C9 C0 B0 32 AE 3D 41 E0 00 D0 AE 05
0050 2B C9 A4 F0 27 C9 A6 F0 23 C9 A8 D4 06
0051 F0 1F C9 A9 F0 1B C9 BA F0 17 8D D6 06
0052 AF 41 8D 4D 41 A2 00 8E 50 41 20 20 04
0053 48 0F AD 4D 41 8D AF 41 4C 62 0F 01 04
0054 4C 95 0C A2 00 8E 50 41 20 9D 1D BE 03
0055 AD AF 41 C9 00 D0 03 4C ED 0B AE 62 05
0056 3C 41 E0 01 F0 08 A2 01 8E 5B 41 5B 04
0057 4C 2C 29 AE B2 41 E0 01 D0 03 4C 7B 04
0058 C9 0C AE 50 41 E0 00 D0 03 4C DC 29 05
0059 0C C9 8C D0 2E AD AF 41 8D 4D 41 52 05
0060 20 48 0F AD 4D 41 8D AF 41 AE 3D 56 04
0061 41 E0 00 D0 08 A2 01 8E 3D 41 4C 31 04
0062 3F 16 A2 00 8E 3D 41 4C 3F 16 A9 8B 03
0063 00 8D AF 41 4C DC 0C C9 85 90 07 D5 04
0064 C9 8D B0 03 4C C9 0C 20 48 0F AD 8E 04
0065 AF 41 C9 00 D0 03 4C E5 0B 20 CC F5 04
0066 FF AE 1D 41 E0 01 D0 73 AE 0F 42 70 05
0067 E0 01 F0 33 AE 50 41 E0 00 F0 2C 82 05
0068 4C 1A 0E 20 E1 18 AE 13 42 E0 01 B5 03
0069 F0 58 AE 21 41 8E 4F 26 AE 22 41 B1 04
0070 86 FC 20 17 1E AE 4F 26 8E 21 41 30 04
0071 A6 FC 8E 22 41 4C 66 0D 4C 56 0F 4A 04
0072 C9 14 F0 D3 AC 21 41 8C 4F 26 AE A5 05
0073 22 41 86 FC A2 00 86 FB AD AF 41 EE 05
0074 AC 4F 26 91 FB 20 2F 1E AE 4F 26 87 04
0075 8E 1F 41 8E 21 41 A6 FC 8E 22 41 BC 04
0076 8E 20 41 20 07 19 AE 29 41 E0 01 74 03
0077 F0 C4 AE 50 41 E0 01 D0 0A AE 0F B8 05
0078 42 E0 01 F0 03 4C 20 0E AD AF 41 7B 04
```

Continued on p. 168.

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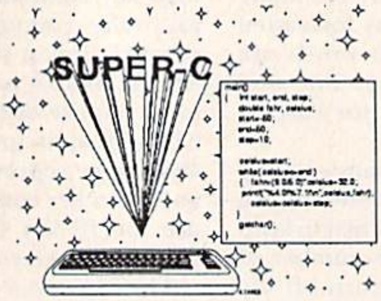

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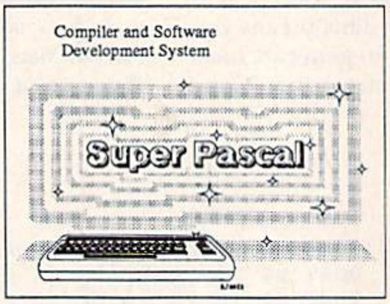
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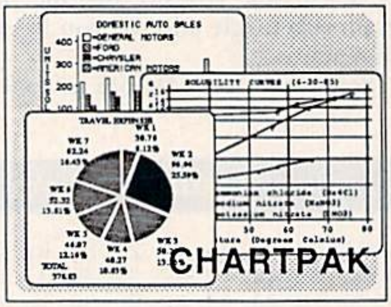
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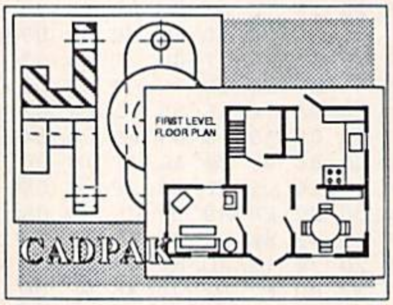
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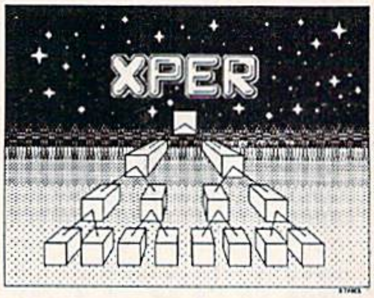

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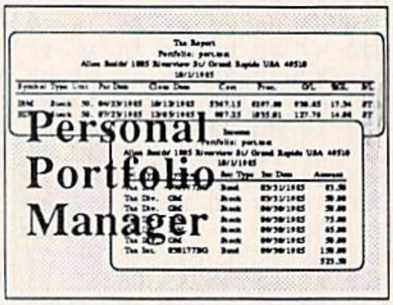
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ML Perfect Typist For the C-64

Enter machine language programs quickly and accurately with this ML checksum, which also serves as the entry program for Runterm Plus, a high-quality terminal program featured elsewhere in this issue.

By ROBERT SIMS

ML Perfect Typist is a checksum for machine language programs to be run on the C-64 (or the C-128 in C-64 mode). It is also the entry program for Runterm Plus (see p. 42 in this issue). To use it, you first type it in as you do any Basic program in *RUN*.

When you load and run ML Perfect Typist, the Basic portion of the program Pokes into memory the machine code from the Data statements and executes the code.

Typing in Machine Language Listings

Machine language listings in *RUN* consist of a series of program lines, each of which begins with a four-digit number, the line number, followed by 13 pairs of characters, separated by spaces.

You do not enter the line number; the program enters it for you automatically. The spaces in the lines are for ease of reading only; they also appear automatically.

The pairs of characters are hexadecimal numbers. The first eleven pairs are the program's machine code. The last two pairs in each line are checksum values used by ML Perfect Typist to ensure that you've entered the line correctly.

To type in a machine language listing, first load and run ML Perfect Typist. At the opening menu, select 1 to enter a new program.

You will see a line number on the screen. Find this line number in the listing and type in the characters that follow the line number. ML Perfect Typist automatically takes care of spacing on the screen. If you make a mistake, simply delete your error and retype the character.

When you've typed in the 13 pairs of characters, compare what you see on the screen with the line in the magazine. If they're the same, press the return key. If you find an error, use the delete key to back up to the incorrect character. Type the correct character, then reenter the rest of the line. Check it again, then press the return key.

If the line has been entered correctly, ML Perfect Typist will prompt you with the number of the next line to be entered. If you've made a mistake, Perfect Typist will alert you to this and prompt you to enter the same line again.

The line is not processed until you press the return key and ML Perfect Typist verifies the contents. The line is then converted to binary numbers and stored in its proper place in memory.

Safety Features

ML Perfect Typist will accept only the keys 0–9, A–F, delete and return. If, for example, you mean to press the 7 key but hit the T key instead, ML Perfect Typist will ignore the T and wait for you to press a valid key.

In case of power failure or other disaster, it's a very good precaution to save your entries to disk every 50 lines or so.

Command Codes

There are three command codes, generated with the CTRL key: CTRL-A, CTRL-C and CTRL-E.

If you enter CTRL-A (hold down the CTRL key and press A), the program will abort. Only use CTRL-A if you become hopelessly confused while entering a listing. CTRL-A causes ML Perfect Typist to end without saving the entered lines to disk.

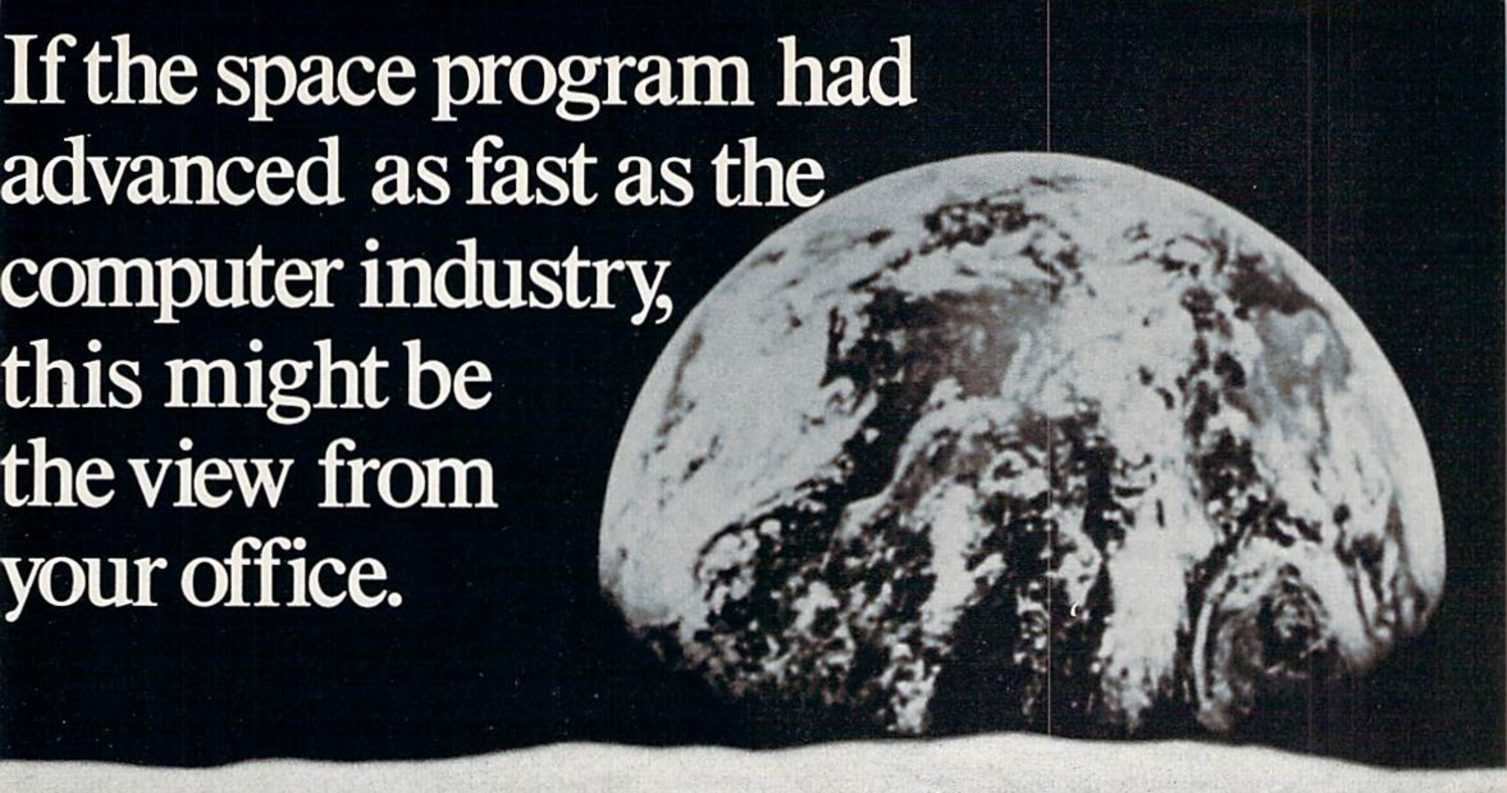
Use CTRL-C to cancel entry of a line. When you type CTRL-C, ML Perfect Typist will erase the line and prompt you to enter it again. Only the current line is affected.

Handling Incomplete Programs

CTRL-E has two uses. First, use it if you want to end a session before you've entered the complete listing. Be sure, of course, to have a disk in the drive, or you'll lose the data you've already entered. Instead of entering the next line, Press CTRL-E.

RUN It Right

C-64; C-128 (in C-64 mode); disk drive



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You'll be asked for a filename. Then a short menu will be displayed. Choose option 2. When you select option 2, ML Perfect Typist will save the incomplete file to disk.

Caution: You *must* use option 2 to save your incomplete file! If you use option 1, you'll never be able to recover your program for further line entry. Also, if you name a file that exists on the disk, ML Perfect Typist will scratch the old file and replace it with the new one.

Later, when you're ready to resume entering the listing, load and run ML Perfect Typist and select 2 from the opening menu. You'll then receive a prompt for the filename. Enter the name of the incomplete file and press the return key. ML Perfect Typist will load that file into memory and then display your next line number. This is a handy feature because it always identifies the next line to be entered. Resume entry by typing in the character pairs in the line whose number is displayed.

Storing a Completed Program

The second use for CTRL-E comes when you have entered the last line of a listing. When you are prompted with a line number larger than the last line number in the listing, enter CTRL-E and supply the filename. Next, you will see the menu. Select option 1 for storing a completed program, and ML Perfect Typist will store it to disk. Again, you *must* have a disk in the drive before you enter CTRL-E.

Caution!

If you follow instructions, ML Perfect Typist will give you an error-free copy of the machine language program you enter. However, keeping in mind the theory that, if anything can go wrong, it will, take precautions. When entering your program lines be sure that you are entering them in the correct sequence. Do this by checking the line number on the screen against the one you are entering from the magazine.

Also, you will notice that all lines, except the last one, are the same length. Therefore, when you have entered all the characters in any line except the last one, your cursor should be in the 40th column on the screen. If it isn't, you must have left out one or more characters. If you press the return key at this point, you should get an error message and a prompt to retype the line.

ML Perfect Typist uses the last two character pairs of each line you enter as a checksum, to see whether you've entered the line correctly. There is a slight chance that, if you leave characters out of a line, ML Perfect Typist will add up the value of the characters, compare them to the last two character pairs, find a match and store an incorrect line. To avoid this, always check that your cursor is in the 40th position before you press the return key.

For the special case of the last line, just check to be sure you've entered the correct number of characters.

If you enter too many characters in a line, ML Perfect Typist will alert you to this and prompt you to enter the same line again.

If you don't want to type in ML Perfect Typist, send me $6, and I'll send you a copy on disk. I'll supply the disk, mailer and postage. R

Address all author correspondence to Robert Sims, 7818 Summerfield Road, Summerfield, NC 27358.

Listing 1. *ML Perfect Typist (and Runterm entry) program.*

```
0 REM ML ENTRY                         :REM*214
1 REM ROBERT SIMS                       :REM*73
2 REM 7818 SUMMERFIELD RD              :REM*206
3 REM SUMMERFIELD, NC 27358            :REM*249
4 REM 919-643-7840                     :REM*206
5 REM                                   :REM*67
10 FORB=9728TO11675:READ A:POKEB,A:PRINT"."
   ;:NEXT                              :REM*238
20 POKE631,83:POKE632,89:POKE633,83:POKE634
   ,57:POKE635,55:POKE636,50:POKE637,56
                                       :REM*216
30 POKE638,13:POKE198,8                 :REM*98
40 NEW:END                             :REM*140
101 DATA 165,1,41,254,133,1,32,231,255,32,1
    93,42,32,129,42,162,0,142,33   :REM*233
102 DATA 46,142,34,46,76,69,38,32,204,255,1
    69,3,32,195,255,32,231,255,96  :REM*144
103 DATA 169,0,141,235,45,169,0,133,251,169
    ,48,133,252,96,32,170,42,169,149
                                   :REM*249
104 DATA 141,110,42,169,45,141,111,42,32,98
    ,42,96,32,38,38,169,165,141,110 :REM*66
105 DATA 42,169,44,141,111,42,32,98,42,32,1
    61,42,32,58,43,32,170,42,173    :REM*69
106 DATA 238,45,201,49,240,11,201,50,240,10
    ,201,1,208,216,76,26,38,76,21   :REM*16
107 DATA 39,32,179,42,32,176,41,174,32,46,2
    24,1,208,3,76,26,38,224,3       :REM*17
108 DATA 240,236,32,112,44,174,237,45,169,8
    2,157,156,45,232,169,0,157,156,45:REM*6
109 DATA 142,237,45,32,29,43,174,241,45,224
    ,1,240,206,32,29,44,172,235,45 :REM*139
110 DATA 173,238,45,145,251,32,3,44,32,28,4
    2,173,236,45,201,0,240,232,32  :REM*100
111 DATA 204,255,169,3,32,195,255,32,153,44
    ,173,238,45,141,34,46,32,153,44  :REM*3
112 DATA 173,238,45,141,33,46,162,3,142,233
    ,45,32,153,44,173,238,45,201,48 :REM*14
113 DATA 144,23,201,58,176,19,174,233,45,15
    7,149,45,206,233,45,174,233,45,224
                                   :REM*179
114 DATA 255,208,226,76,21,39,169,215,141,1
    10,42,169,44,141,111,42,32,98,42
                                   :REM*138
115 DATA 162,0,142,33,46,142,34,46,76,69,38
    ,32,107,43,32,52,38,162,0      :REM*143
116 DATA 142,233,45,174,233,45,169,0,157,17
    7,45,238,233,45,174,233,45,224,56
                                    :REM*46
117 DATA 144,238,162,0,142,233,45,32,58,43,
    173,238,45,201,20,208,28,32,137:REM*243
118 DATA 44,174,233,45,224,0,240,236,206,23
    3,45,173,233,45,24,106,144,226,169
                                    :REM*68
119 DATA 20,32,137,44,76,55,39,201,1,208,3,
    76,26,38,201,3,208,3,76         :REM*27
120 DATA 24,39,201,5,208,6,32,183,43,76,175
    ,40,201,13,208,3,76,174,39      :REM*74
121 DATA 174,233,45,173,238,45,157,189,45,2
    38,233,45,173,233,45,24,106,176,5
                                    :REM*37
122 DATA 169,32,32,137,44,174,233,45,224,27
    ,176,3,76,55,39,169,117,141,110 :REM*52
123 DATA 42,169,45,141,111,42,32,98,42,76,2
    4,39,162,0,142,233,45,142,31    :REM*67
124 DATA 46,174,33,46,142,26,46,174,34,46,1
    42,27,46,162,25,142,30,46,174  :REM*200
125 DATA 30,46,189,189,45,201,0,208,13,206,
    30,46,174,30,46,224,0,208,236  :REM*217
126 DATA 76,24,39,141,29,46,206,30,46,174,3
    0,46,189,189,45,141,239,45,32  :REM*194
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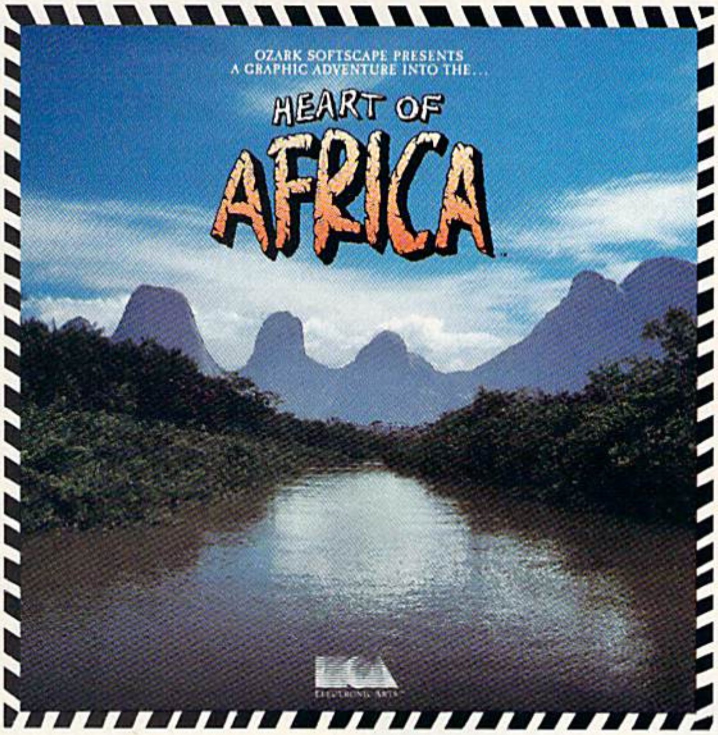

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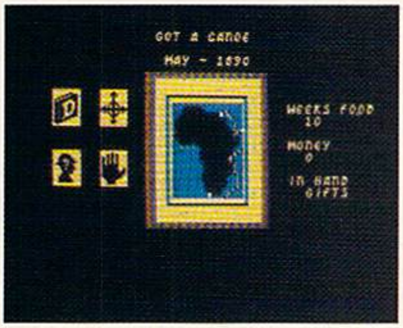

GOT A CANOE
MAY - 1890
WEEKS FOOD 10
MONEY 0
IN HAND GIFTS

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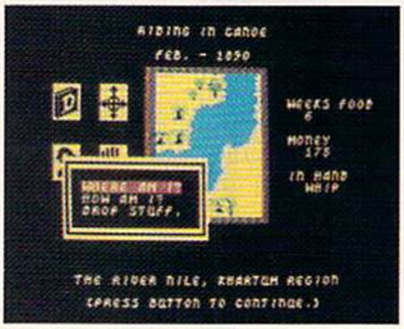

RIDING IN CANOE
FEB. - 1890
WEEKS FOOD 6
MONEY 175
IN HAND WHIP

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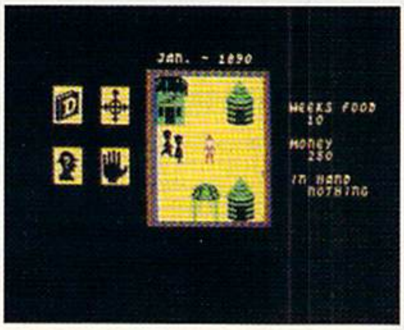

JAN. - 1890
WEEKS FOOD 10
MONEY 250
IN HAND NOTHING

Decipher Native Clues

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Listing 1 continued.

```
127 DATA 47,44,173,29,46,141,239,45,32,79,4
    4,173,239,45,141,29,46,206,30  :REM*121
128 DATA 46,174,30,46,189,189,45,141,28,46,
    206,30,46,174,30,46,189,189,45  :REM*12
129 DATA 141,239,45,32,47,44,173,28,46,141,
    239,45,32,79,44,173,239,45,141 :REM*125
130 DATA 28,46,32,162,40,32,47,44,32,162,40
    ,32,79,44,174,31,46,173,239    :REM*112
131 DATA 45,157,177,45,238,31,46,24,173,239
    ,45,109,26,46,141,26,46,169,0  :REM*107
132 DATA 109,27,46,141,27,46,174,233,45,236
    ,30,46,144,206,174,29,46,236,27:REM*118
133 DATA 46,208,47,174,28,46,236,26,46,208,
    39,174,31,46,142,30,46,162,0   :REM*145
134 DATA 142,31,46,174,31,46,189,177,45,172
    ,235,45,145,251,32,3,44,238,31 :REM*100
135 DATA 46,174,31,46,236,30,46,144,231,76,
    21,39,169,134,141,110,42,169,45:REM*101
136 DATA 141,111,42,32,98,42,76,24,39,174,2
    33,45,189,189,45,141,239,45,238:REM*168
137 DATA 233,45,96,32,179,42,32,176,41,174,
    32,46,224,1,240,243,224,3,240  :REM*249
138 DATA 239,32,112,44,174,237,45,169,87,15
    7,156,45,232,169,0,157,156,45,232
                                   :REM*218
139 DATA 142,237,45,169,3,162,8,160,3,32,18
    6,255,173,237,45,162,155,160,45 :REM*69
140 DATA 32,189,255,32,192,255,32,211,42,17
    4,241,45,224,1,208,3,76,154,41 :REM*130
141 DATA 169,253,141,110,42,169,44,141,111,
    42,32,98,42,32,161,42,32,58,43 :REM*155
142 DATA 173,238,45,141,239,45,201,49,240,4
    ,201,50,208,239,32,58,43,173,238
                                   :REM*198
143 DATA 45,201,13,240,10,201,20,208,242,32
    ,210,255,76,8,41,173,239,45,201:REM*125
144 DATA 50,240,3,76,106,41,162,0,142,233,4
    5,174,233,45,189,149,45,172,235 :REM*80
145 DATA 45,145,251,32,3,44,238,233,45,174,
    233,45,224,4,144,232,173,33,46 :REM*113
146 DATA 172,235,45,145,251,32,3,44,173,34,
    46,172,235,45,145,251,32,3,44  :REM*224
147 DATA 173,235,45,141,239,45,165,252,141,
    240,45,32,38,38,162,3,32,201,255
                                   :REM*177
148 DATA 172,235,45,177,251,32,210,255,32,3
    ,44,166,252,236,240,45,144,238,174
                                   :REM*210
149 DATA 235,45,236,239,45,144,230,76,26,38
    ,32,204,255,169,3,32,195,255,169
                                   :REM*227
150 DATA 15,32,195,255,32,231,255,32,193,42
    ,76,175,40,162,48,142,156,45,162
                                   :REM*136
151 DATA 58,142,157,45,162,2,142,233,45,162
    ,0,142,32,46,32,37,42,173,238   :REM*57
152 DATA 45,201,20,208,16,32,137,44,174,233
    ,45,224,3,144,236,206,233,45,76 :REM*36
153 DATA 196,41,201,1,208,6,141,32,46,76,23
    9,41,201,3,208,4,141,32,46     :REM*243
154 DATA 96,32,137,44,173,238,45,201,13,208
    ,3,76,16,42,174,233,45,224,18   :REM*18
155 DATA 176,12,173,238,45,157,156,45,238,2
    33,45,76,196,41,174,233,45,169,0
                                   :REM*247
156 DATA 157,156,45,142,237,45,96,32,183,25
    5,41,64,141,236,45,96,32,204,255
                                   :REM*166
157 DATA 32,228,255,201,0,240,246,141,238,4
    5,201,1,240,43,201,3,240,39,201 :REM*81
158 DATA 13,240,35,201,20,240,31,201,32,144
    ,223,201,91,144,23,201,97,144,215
                                   :REM*116
159 DATA 201,125,144,15,201,187,240,11,201,
    193,144,203,201,219,144,3,76,37,42
                                   :REM*109
160 DATA 96,162,0,142,234,45,32,204,255,174
    ,234,45,189,98,42,141,238,45,201
                                   :REM*152
161 DATA 0,240,9,32,137,44,238,234,45,76,10
    6,42,96,32,204,255,169,151,32  :REM*181
162 DATA 137,44,169,147,32,137,44,173,24,20
    8,41,253,141,24,208,169,14,141,32
                                   :REM*160
163 DATA 208,169,1,141,33,208,96,32,204,255
    ,169,62,32,137,44,96,32,204,255 :REM*37
164 DATA 169,13,32,137,44,96,169,105,141,11
    0,42,169,45,141,111,42,32,98,42:REM*242
165 DATA 96,169,15,162,8,160,15,32,186,255,
    169,0,32,189,255,32,192,255,96 :REM*119
166 DATA 32,204,255,162,0,142,241,45,162,15
    ,32,198,255,162,0,142,234,45,32:REM*212
167 DATA 228,255,172,234,45,153,242,45,238,
    234,45,201,13,208,240,169,0,172,234
                                    :REM*31
168 DATA 45,153,242,45,173,242,45,201,50,14
    4,21,32,204,255,162,1,142,241,45:REM*18
169 DATA 169,242,141,110,42,169,45,141,111,
    42,32,98,42,32,204,255,96,169,3 :REM*57
170 DATA 162,8,160,3,32,186,255,173,237,45,
    162,156,160,45,32,189,255,32,192
                                   :REM*194
171 DATA 255,32,204,255,32,211,42,96,32,204
    ,255,32,228,255,141,238,45,201,20
                                   :REM*237
172 DATA 240,35,201,13,240,28,201,1,240,27,
    201,3,240,23,201,5,240,19,201   :REM*24
173 DATA 48,144,223,201,58,144,8,201,65,144
    ,215,201,71,176,211,32,137,44,96
                                   :REM*199
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Listing 1 continued.

```
174 DATA 162,3,142,234,45,174,234,45,189,14
    9,45,201,57,208,38,174,234,45,224
                                    :REM*238
175 DATA 0,240,14,169,48,174,234,45,157,149
    ,45,206,234,45,76,112,43,169,48:REM*149
176 DATA 141,149,45,141,150,45,141,151,45,1
    41,152,45,76,169,43,170,232,138,174
                                     :REM*24
177 DATA 234,45,157,149,45,238,33,46,174,33
    ,46,224,0,208,3,238,34,46,96     :REM*51
178 DATA 162,3,142,234,45,174,234,45,189,14
    9,45,201,48,208,21,174,234,45,224
                                     :REM*80
179 DATA 0,240,26,169,57,174,234,45,157,149
    ,45,206,234,45,76,188,43,170,202 :REM*7
180 DATA 138,174,234,45,157,149,45,76,245,4
    3,169,48,141,149,45,141,150,45,141
                                    :REM*194
181 DATA 151,45,141,152,45,206,33,46,174,33
    ,46,224,255,208,3,206,34,46,96 :REM*107
182 DATA 238,235,45,174,235,45,224,0,208,2,
    230,252,96,206,235,45,174,235,45:REM*10
183 DATA 224,255,208,2,198,252,96,32,204,25
    5,162,3,32,198,255,32,207,255,141
                                    :REM*191
184 DATA 238,45,32,204,255,96,173,239,45,20
    1,58,144,15,41,15,24,105,9,10  :REM*190
185 DATA 10,10,10,141,240,45,76,78,44,41,15
    ,10,10,10,10,141,240,45,96      :REM*245
186 DATA 173,239,45,201,58,144,11,41,15,24,
    105,9,141,239,45,76,102,44,41    :REM*70
187 DATA 15,141,239,45,173,239,45,13,240,45
    ,141,239,45,96,174,237,45,169,44
                                    :REM*139
188 DATA 157,156,45,232,169,80,157,156,45,2
    32,169,44,157,156,45,232,142,237,45
                                    :REM*200
189 DATA 96,72,169,20,32,210,255,104,32,210
    ,255,169,164,32,210,255,96,32,16:REM*31
190 DATA 44,172,235,45,177,251,141,238,45,9
    6,13,13,32,49,41,32,78,69,87     :REM*52
191 DATA 32,80,82,79,71,82,65,77,13,32,50,4
    1,32,80,82,79,71,82,65           :REM*11
192 DATA 77,32,80,65,82,84,73,65,76,76,89,3
    2,69,78,84,69,82,69,68          :REM*212
193 DATA 13,13,0,13,78,79,84,32,65,78,32,73
    ,78,67,79,77,80,76,69           :REM*113
194 DATA 84,69,32,70,73,76,69,46,32,84,82,8
    9,32,65,71,65,73,78,46          :REM*110
195 DATA 13,13,0,13,32,49,41,32,83,84,79,82
    ,69,32,84,72,69,32,67            :REM*53
196 DATA 79,77,80,76,69,84,69,68,32,80,82,7
    9,71,82,65,77,13,13,32          :REM*188
197 DATA 50,41,32,83,84,79,82,69,32,65,78,3
    2,73,78,67,79,77,80,76           :REM*23
198 DATA 69,84,69,32,80,82,79,71,82,65,77,3
    2,65,78,68,13,32,32,32           :REM*74
199 DATA 32,70,73,78,73,83,72,32,73,84,32,7
    6,65,84,69,82,13,13,0            :REM*59
200 DATA 48,49,50,51,52,53,54,55,56,57,65,6
    6,67,68,69,70,70,73,76          :REM*242
201 DATA 69,78,65,77,69,32,62,32,0,13,13,76
    ,73,78,69,32,84,79,79           :REM*175
202 DATA 32,76,79,78,71,13,0,13,13,69,78,84
    ,82,89,32,69,82,82,79           :REM*222
203 DATA 82,13,0,48,48,48,48,13,0,64,0
                                    :REM*191
```

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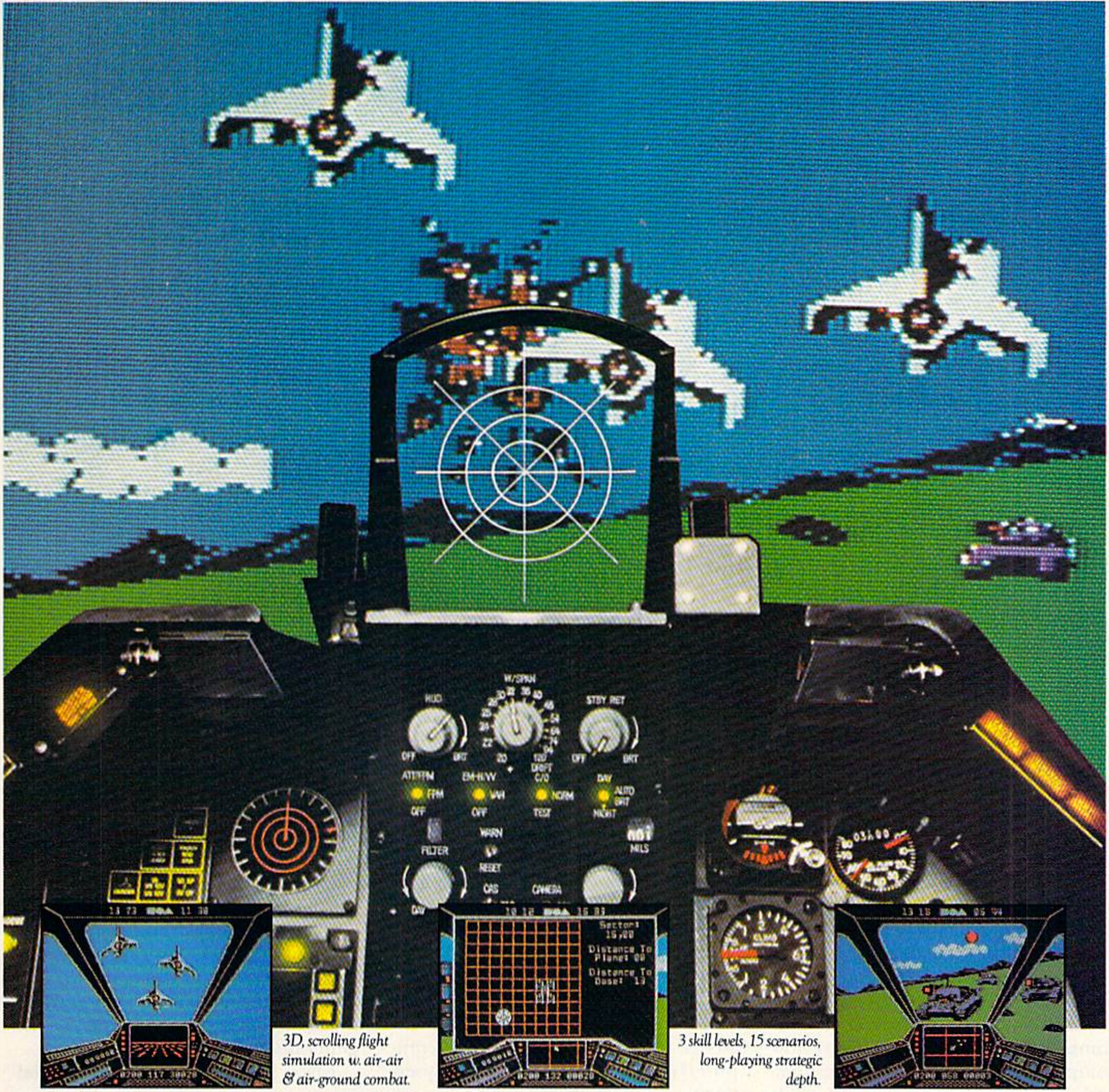

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On-line with Viewtron

This general-interest on-line utility offers numerous services, including an electronic auction and on-line banking.

By MARGARET MORABITO

Viewtron, created by Knight-Ridder Newspapers, Inc., is a new on-line general-interest network that made its national appearance in October. It isn't a brand-new network, however; Viewtron began in 1983 as a regional network, serving single-function terminals in southern Florida. It was very successful as an on-line network, providing in the Miami area a variety of consumer and information services, including on-line banking.

After two years, Viewtron has become a national network and is now compatible with personal computers such as Apple II and Commodore. It provides services to fit the needs of both home users and businesses and has many special services targeted exclusively at Commodore owners. Viewtron allows full-color graphics telecommunications, a perfect way to take advantage of the C-64 and C-128.

Commodore-Specific Services

Viewtron offers databases filled with reviews of Commodore products. It already has over 500 reviews of various Commodore software programs in categories including education, entertainment, business, word processing and personal use. The number of reviews is growing as Viewtron adds up-to-date reviews biweekly.

Various sources are tapped for these reviews, including computer magazines. *RUN* is participating in Viewtron's review section. We are posting our Software Gallery on Viewtron and will be updating it monthly in 1986.

Additionally, Viewtron offers an advice section for Commodore computerists. Subscribers can leave questions about hardware and software products, and both the experts and other subscribers will participate in answering them.

If you wish, you may buy software for your Commodore computer on Viewtron. Many of the software products reviewed are available for purchase at discount prices. This on-line buying will be handled by a major mail-order company.

An interesting and different section on Viewtron is the electronic auction, which is held 24 hours a day. For sale is Commodore-specific software and hardware, as well as appliances and brand-name merchandise. Every 15 minutes, the price of an auctioned item is dropped and continues to drop until someone bids on it. This opens up all kinds of savings opportunities, if you're interested in participating.

In addition to the consumer and information services, there is also a large communications section. The Commodore bulletin board network is indexed by software, hardware and general Commodore questions.

Also, you may set up a special-interest group (SIG) on Viewtron for free.

Viewtron will also be offering eight special-interest groups tailored to Commodore users: For Starters, Advanced, Off-Beat, Artists Anonymous, Musical Madness, Games, User Groups and Software Developers.

For Starters will provide information for new C-64, C-128 and Amiga owners. The Advanced SIG offers technical information about Commodore computers, including topics on 65XX machine language, 1541/

unications

SEASONS GREETINGS
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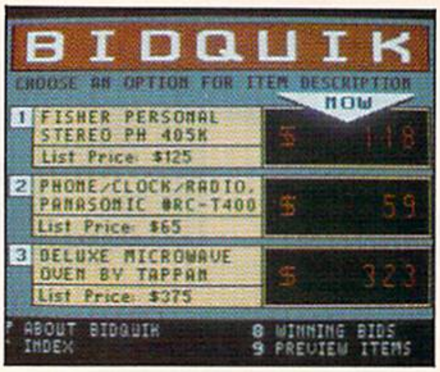

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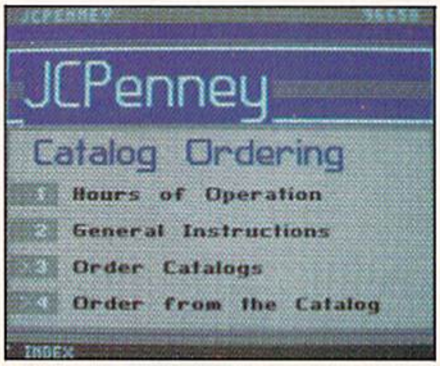
7 ABOUT BIDQUIK
* INDEX
8 WINNING BIDS
9 PREVIEW ITEMS

Viewtron offers an electronic auction, which gives you a chance to bid against other Viewtron users for quality merchandise at bargain prices.



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1 Hours of Operation
2 General Instructions
3 Order Catalogs
4 Order from the Catalog

INDEX

Using Viewtron, you have the convenience of shopping from your own home.

1571 DOS, COMAL, C, terminal programs, BBS systems and hardware.

Off-Beat offers a combination of movie madness, role-playing, creative writing, trivia, games and chatting. Artists Anonymous provides a forum that on-line artists can use to share their drawings and trade tips with other artists using Commodore computers.

Musical Madness is designed for musicians and others interested in making music on their computers. Commercial music programs will be discussed on this SIG. The Games SIG allows for swapping Commodore games and ideas.

User Groups is open only to Commodore User Group officers. Here, you can discuss your ideas and concerns about running your own user's group.

Software Developers is a new idea for a SIG. If you are a software developer, this is the area where you can meet other Commodore software developers and discuss industry trends.

Like most on-line networks, Viewtron has a national CB, or citizen's band, radio. This computerized version of a CB radio includes special channels for information about Commodore software and hardware.

Other Services

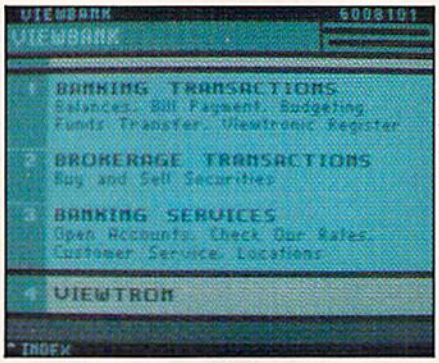
Viewtron is not exclusively a Commodore network, although it does place great emphasis on Commodore users. This network also holds many services that you would expect to find on networks like The Source, CompuServe and Delphi.

News, weather forecasts, sports scores, stock prices, airline schedules and fares, consumer reports and movie and book reviews are all available on-line.

Furthermore, on-line banking is available. Viewtron was very successful in southern Florida with its on-line banking service. Banking is now becoming available on a national level. You can pay bills, get your current account balance and leave electronic messages for your bank while on-line.

The Terminal Software

Viewtron is software-specific for the C-64 and C-128 (in C-64 mode). Other on-line networks that fall into this category are PlayNet, QuantumLink and TeleLearning.



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Open Accounts, Check Our Rates,
Customer Service, Locations

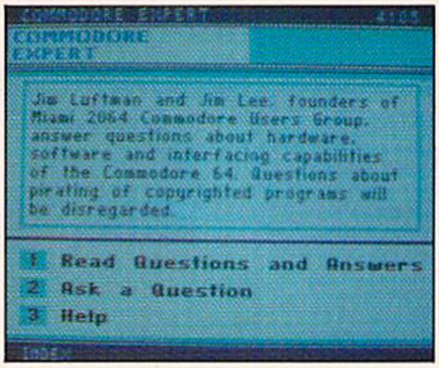
4 VIEWTRON

* INDEX

On-line banking with Viewtron puts banking services at your fingertips.

To take advantage of Viewtron, you have to buy a starter kit, which costs $9.95. With the kit, you get one free hour on-line, a user's guide and a disk that is compatible with your computer. The disk holds the terminal program, which is specifically tailored to Viewtron and takes advantage of the Commodore's color and sound.

When you boot up the disk, you will fill in your log-on information. This includes the kind of Commodore computer and modem that you're using, your identification number and password (both provided in the user's guide along with your disk) and your local packet-switched phone number (either Telenet, Tymnet or Uninet).



COMMODORE EXPERT 4103

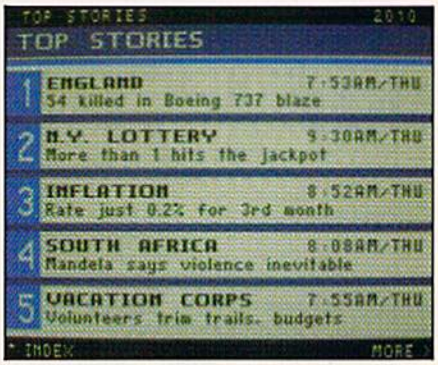
COMMODORE EXPERT

Jim Luftman and Jim Lee, founders of Miami 2064 Commodore Users Group, answer questions about hardware, software and interfacing capabilities of the Commodore 64. Questions about pirating of copyrighted programs will be disregarded.

1 Read Questions and Answers
2 Ask a Question
3 Help

INDEX

Got a question or problem with your Commodore? On Viewtron, you can get the answer quickly by asking the "Commodore experts."



TOP STORIES 2010

TOP STORIES

1 ENGLAND 7:53AM/THU
54 killed in Boeing 737 blaze

2 N.Y. LOTTERY 9:30AM/THU
More than 1 hits the jackpot

3 INFLATION 8:52AM/THU
Rate just 0.2% for 3rd month

4 SOUTH AFRICA 8:08AM/THU
Mandela says violence inevitable

5 VACATION CORPS 7:55AM/THU
Volunteers trim trails, budgets

* INDEX
MORE >

Read the latest headline-making news events on Viewtron as they happen.

Once you enter this information, it is automatically saved to your Viewtron disk. All this occurs off-line, so you can take your time. From then on, whenever you want to log on, you simply load and run the Viewtron program and select the sign-on prompt from a simple menu. This terminal program will only work with Viewtron.

Need a Modem?

If you don't already have a modem, you can buy one of two modems that Viewtron is selling. With it, you will receive the Viewtron starter kit free.

The Westridge 6420, a 300-baud modem by Anchor Automation, is available for $39.95. This modem has auto-dial and auto-answer features and will work with many other terminal programs besides Viewtron.

For $189.95, you can buy a 1200-baud modem, called the Volksmodem 12, also made by Anchor Automation. (See the review article in this issue for more details on some available modems.)

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Viewtron has been advertising heavily for several months. To receive a modem with the free software or the starter kit alone, call 1-800-543-5500, department 9401. This is a voice line and is available 24 hours a day, seven days a week. The alternative is to fill out the coupon accompanying the Viewtron magazine advertisements. You will need a major credit card for either method of purchasing your equipment.

Viewtron's Advantages

Viewtron is implementing some new marketing strategies. For one, they do not charge a subscription fee like most other networks do. You essentially are only paying the price of a public-domain disk or their terminal program. Also, you do not get charged extra for using a 1200-baud modem, as you do on many of the other major networks.

Furthermore, there is no monthly minimum usage fee on Viewtron. You only pay for what you use, and how much you use is totally up to you. The going rate for on-line time on Viewtron is nine cents a minute ($5.40/hour) on weekday nights and on weekends, and 22 cents a minute ($13.20/hour) for prime time during weekdays.

For more information about Viewtron, contact: ViewData Corporation of America, Inc., 1111 Lincoln Road, 7th Floor, Miami Beach, FL 33139.

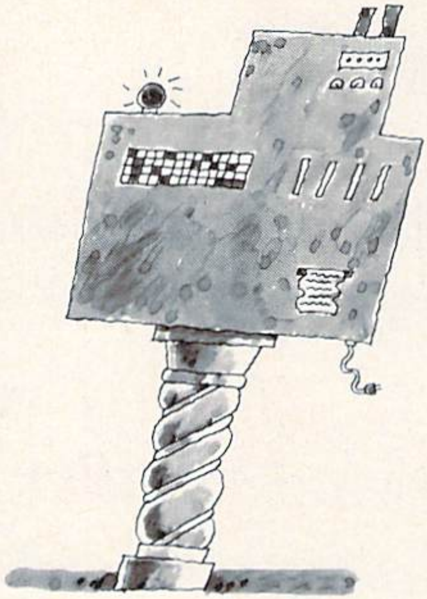
The field of telecommunications is rapidly widening, and it's clear that Commodore owners are among a select group that is gathering much attention from the on-line networks. When you see so many networks making their software Commodore-specific, you know that there must be a marketing reason behind it.

Commodore owners are the largest group of personal computerists in the world, and we are rapidly becoming the most sought-after group for on-line telecommunicating. We are fortunate in this because we are getting the best that is available and are participating in some of the newest technology in the field of personal computing.

Next month, we'll take a look at BRS, one of the largest information networks for serious research and study. R

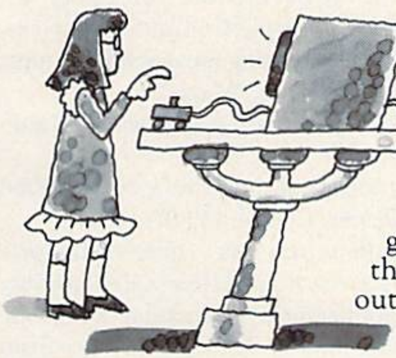
Address all author correspondence to Margaret Morabito, c/o RUN editorial, 80 Pine St., Peterborough, NH 03458.

WANTED: OLD THINKER TOYS.

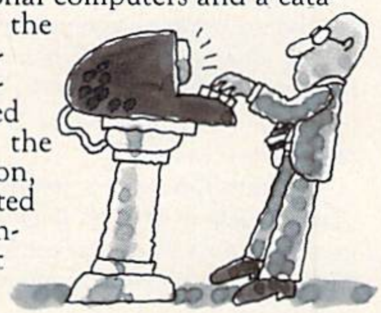


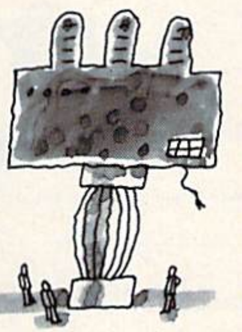
CW Communications, ComputerLand and The Computer Museum invite you to send in your early personal computers, software, and memorabilia — you could win a free trip to The Computer Museum in Boston

Your old, dusty "thinker toy" may now be ready to become a treasured museum piece. The Computer Museum in downtown Boston — an international museum dedicated entirely to computing — is searching for the very best and most unique relics of the personal computer revolution.



ComputerLand, CW Communications, and The Computer Museum are working together to bring these early relics out of your attic and into the collection of The Computer Museum. The museum is especially looking for kit machines, prototypes, programs, output, newsletters and memorabilia of early computing from around the world. A selection of the finest items will be used to create an exhibit on the evolution of personal computers and a catalog highlighting the Museum's collections. If your submission is accepted for addition to the Museum collection, you will be invited to the grand opening of the exhibit and will receive a bound edition of the catalog. If your item is selected as one of the five best "finds", you will also receive an all-expense-paid trip to Boston for the grand opening party.





So, get up to the attic, down to the cellar and into your closets, and tell us what you find! Call or write the Museum for an official entry form, or send a photo and description of your items by March 1, 1986 to: The Computer Museum, Personal Computer Competition, 300 Congress St., Museum Wharf, Boston, Massachusetts USA 02110, (617) 426-2800, Telex: 62792318.

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Entries will be judged on significance, rarity, date, completness and condition. Items particularly sought include pre-1980 machines, early serial numbers (get those number 1's out), machines made for purchase outside of North America (even modern machines are sought in this category); first releases of software such as first releases of operating systems, languages and mass-marketed and original applications; and pre-1980 photographs, newsletters, manuals and other records. The Computer Museum is a private non-profit educational institution. All donations are tax-deductible according to the provisions of the Internal Revenue Service. Thinker Toys is a registered trademark of George Murrow & Murrow Designs, Inc.

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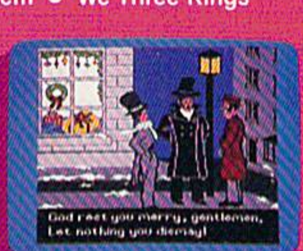
- Jolly Old St. Nicholas
- Joy to the World
- O Christmas Tree
- Silent Night
- What Child is This?
- Up on the Housetop



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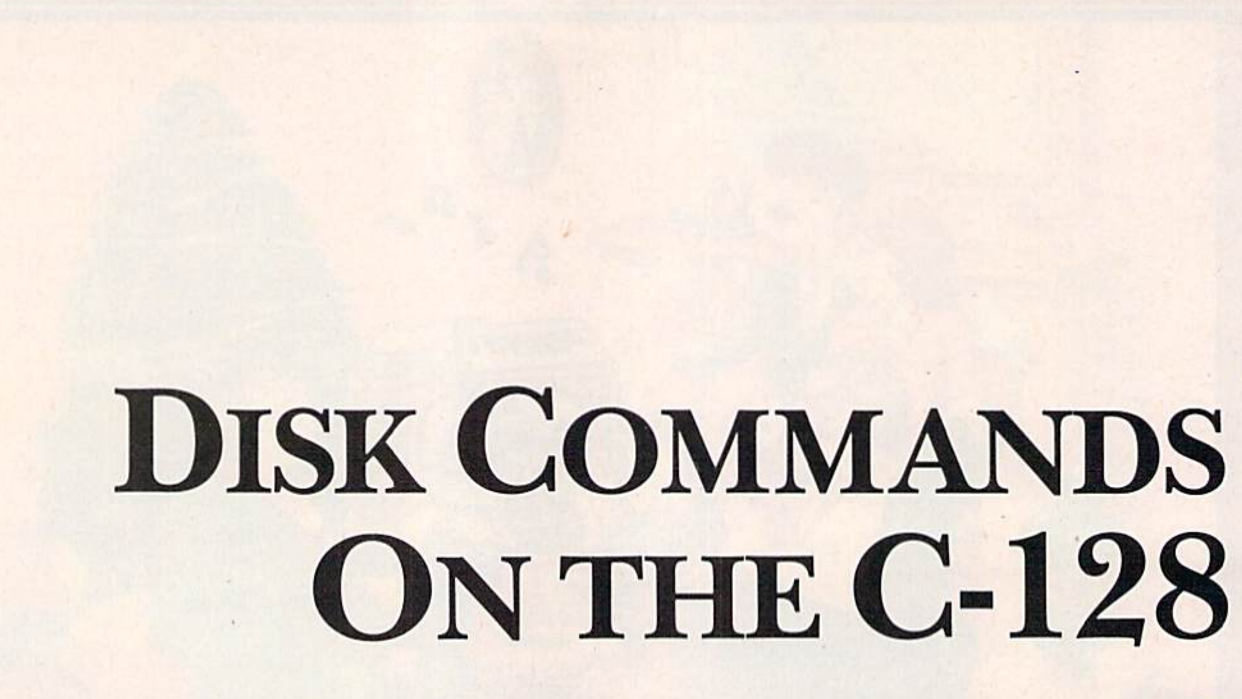

DISK COMMANDS ON THE C-128

By DAVID DARUS and LOUIS WALLACE

Here's an overview of the C-128 mode disk commands, along with a disk utility for autobooting your programs.

The C-128's Basic 7.0 includes a large number of high-level DOS commands. These commands allow the C-128 owner to use a disk drive without having to resort to cryptic statements. All DOS statements can be used from Program mode, allowing the programmer to take full advantage of the disk drive.

Disk commands fall into several categories. There are housekeeping commands such as Backup, Collect, Concat, Copy, Header, Rename and Scratch. There are file-information commands like Catalog and Directory. In the file-transfer category, you have DLoad, DSave, BLoad, BSave and DVerify. You can also load and run a Basic program in one statement by using RUN"filename"; or load and execute a machine language program with BOOT"filename".

The last category deals with datafile programming commands. These include Append, DClear, DCLose, DOpen and Record, as well as the Basic 2.0 Get#, Print# and Open/Close commands. Finally, the C-128 has the capability of autobooting a Basic or machine language program when the computer is turned on.

The Disk Commands

Remember the first time you tried to format a disk with the 1541? Most people are initially confused by having to open channels and send disk commands. On the C-128, the Header command does all that. The syntax is

```
HEADER "diskname",Iid,D0, <ON Un>
```

(Parameters within the inequality signs are optional and may be omitted.) The diskname is any string of characters up to 16, and id is any two-digit code. D0 indicates drive 0, but you may use D1 on a dual drive. U stands for device n, so this command would format a disk on a second drive (device n). The I,D and U prefixes are required if these parameters are used. The device number is optional and defaults to device 8. A nice feature of the Header command is that when you use it in Direct mode, you're prompted with "Are you sure?" before the command is executed, just in case you want to change your mind.

The Scratch command will also ask you to confirm before it erases a file from the disk. Its syntax is

```
SCRATCH"filename"<,Dn,Un>
```

If you have a dual drive you can also use

```
BACKUP D0 TO D1 <ON Un>
```

to form and duplicate a disk in drive 0 to drive 1, using the default device 8 or adding the option ON Un for a different drive number. The Copy command will copy files to another disk on a dual drive or to the same disk on a single drive. To change a filename to something different, you use

```
RENAME "old name" TO "new name"
<,Dn,Un>
```

Sometimes you need to validate a disk that has had a lot of files written

JAMES ENDICOTT

RUN It Right

C-128; 1571 disk drive

```
APPEND #lfn, “filename”<,Dn><ON, Un>
BACKUP source Dn TO destination Dn<ON, Un>
BLOAD “filename” <,Dn><,Un><,Bn><Pstart address>
BOOT <“filename”<,Dn><ON, Un>>
BSAVE “filename”<Dn><,Un><,Bn>,Pstart address TO Pend address
CATALOG <Dn><ON, Un><,wildcard string>
CLOSE file number
CMD logical file number<, write list>
COLLECT <Dn><ON, Un>
CONCAT “file2” <,Dn> TO “file1”<,Dn><ON, Un>
COPY “source filename”<,Dn> TO “destination filename”<,Dn><ON, Un>
DCLEAR <Dn><ON, Un>
DCLOSE <#lfn><ON, Un>
DIRECTORY <Dn><ON, Un><,wildcard string>
DLOAD “filename”<,Dn><,Un>
DOPEN #lfn, “filename<,S/P>”<,Lrecord len><,Dn><ON, Un><,W>
DSAVE “filename”<,Dn><ON, Un>
DVERIFY “filename”<,Dn><ON, Un>
GET# file number, variable list
HEADER “diskname”<,Iid><,Dn><ON, Un>
INPUT# file number, variable list
LOAD “filename”<,device number><,relocate flag>
OPEN lfn,dev numb <,sec addr><,“filename,filetype,mode”>/<,cms string>
PRINT# file number, print list
RECORD #lfn, record number<,byte number>
RENAME “oldfilename” TO “newfilename”<,Dn><,Un>
RUN “filename”<,Dn><,Un>
SAVE <“filename”><,device number><,EOT flag>
SCRATCH “filename”<,Dn><,Un>
VERIFY “filename”<device number><,relocate flag>
```

Table 1. *C-128 disk commands.*

and erased on it. Or perhaps you have files with an asterisk that will not scratch properly. In these cases, the Collect <Dn ON, Un> command should be used to free the disk space for use. You can merge two files together with the command

```
CONCAT “file2”<,Dn> TO “file 1”
<,Dn><ON, Un>
```

File 1 will now have file 2 added to the end of it.

File directories can be retrieved in three ways. You have the Directory and Catalog commands, each of which lists the disk filenames to the screen, or you can use the C-64 LOAD“$”,8 if you want to load into memory a directory that can be listed to a printer.

You can still load a program with LOAD “filename”,8. However, there are several new methods on the C-128. You can load a Basic program (without the ,8) using

```
DLOAD “filename”<,Dn>
```

No device number is needed if it is device 8, and you don't even have to add the last quote mark. You can load machine code or binary data with

```
BLOAD “filename”<,Dn><,Un>
<,Bn><,Pstart address>
```

If only the filename is given in a BLoad, the file is loaded from device 8 to the address from which it was saved. You may specify the drive, device, RAM bank and address by using the extra parameters.

To save a Basic file, you can use

```
DSAVE “filename”<,Dn><ON, Un>
```

in addition to the C-64 Basic 2.0

```
SAVE “filename”,8
```

For binary files, you use

```
BSAVE “filename”<,Dn><,Un>
<,Bn>,Pstart address TO Pend address
```

The start and stop addresses are in decimal and are required; the bank number is optional and can be any of the 16 banks (0–15).

You can verify a Basic file in memory with a file on the disk by using

```
DVERIFY“filename”<,Dn><ON, Un>
```

To verify a binary file, use Basic 2.0

```
VERIFY “filename”,8,1
```

One of the really nice features is the ability to load and run a Basic or machine language program by using one command. For Basic, it is

```
RUN“filename”<,Dn><,Un>
```

which loads a program called filename from disk and runs it. Machine language uses

```
BOOT“filename”<,Dn><,Un>
```

which loads a machine language program to the location from which it was saved and begins executing it at that address. Using Boot without any parameters will also cause an autoboot disk to load and run its designated program.

To make it easier to use sequential and relative datafiles on the C-128, several new commands have been added to those found in C-64 Basic 2.0. Opening a file can be done with

```
DOPEN #lfn,“filename<,s/p>”<,Ln>
<,Dn><,ON Un><,W>
```

Only the filename and a logical file number (lfn = 0–255) are required to read a sequential file. Program and sequential files can be specified using p or s with the filename. A relative file is indicated when its length is given (L = 1–255). When writing a program or sequential file, you must include the W parameter.

If you wanted to add data to an existing file, you would use the Append command. Its syntax is

```
APPEND #lfn,“filename”<,Dn><ON, Un>
```

This command opens the file and adds to the end of the file all subsequent data directed to it. This makes it easy to update sequential data. These commands can be used in place of Basic's Open command for many file operations.

The Get# and Print# commands for reading and writing files are used the same way as in Basic 2.0. However, relative files have additional support in the new Record command. This command positions the relative-file pointers to a specified byte within a particular record. Its syntax is

```
RECORD #lfn,record number<,byte
number>
```

The record number can be in the range of 0 to 65535, and the byte number is from 1 to 254. When you're writing to a relative file with a record number higher than the last record in the file, new records are created to expand the file. The byte number directs the file pointer to start at an exact point within a record, so you can gain access to a certain segment of that record.

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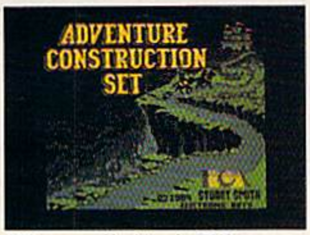
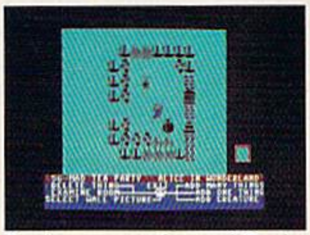
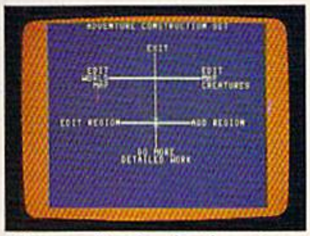

ADVENTURE
CONSTRUCTION
SET

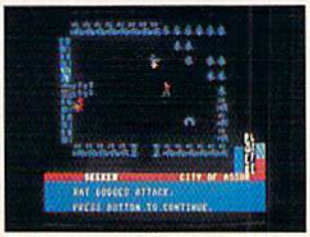
ACS is your tool kit. More than 7000 parts to build from. Power to spare!



Or make your own parts from scratch. Draw 'em. Give 'em properties. Go for it!


ADVENTURE CONSTRUCTION SET
EXIT
EDIT MAP
EDIT CREATURES
EDIT REGION
ADD REGION
DO MORE DETAILED WORK

ACS is menu driven. It works with a positive "stick shift" controller. Easy as pie!


SEEKER
CITY OF ASSUR
RAT DODGED ATTACK.
PRESS BUTTON TO CONTINUE.

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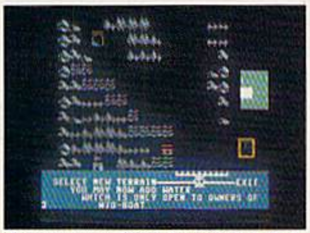
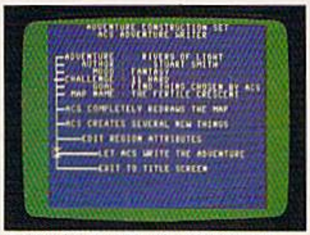
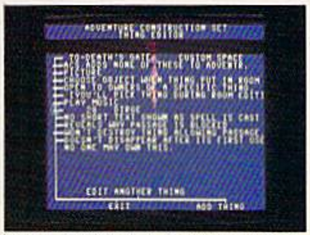

SELECT NEW TERRAIN
EXIT

YOU MAY NOW ADD WATER WHICH IS ONLY OPEN TO OWNERS OF HYD-BOAT

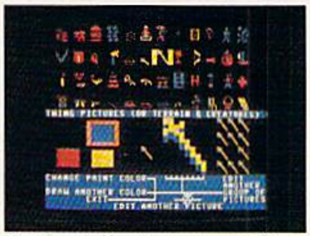
Mountains, oceans, forests & etc. are pre-built. Or make your own landscapes. You're the boss!


ADVENTURE CONSTRUCTION SET
ACS ADVENTURE WRITER
ADVENTURE
AUTHOR
MOOD
CHALLENGE
GOAL
MAP NAME
ACS COMPLETELY REDRAWS THE MAP
ACS CREATES SEVERAL NEW THINGS
EDIT REGION ATTRIBUTES
LET ACS WRITE THE ADVENTURE
EXIT TO TITLE SCREEN

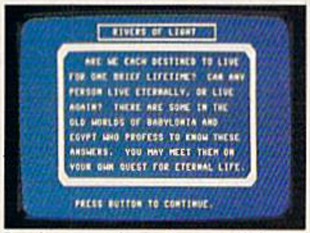
Amazing fact #1: ACS makes adventures (& finishes parts of yours) by itself. This is No Lie!


ADVENTURE CONSTRUCTION SET
EDIT ANOTHER THING
EXIT
ADD THING

Music modules & sound effects included. Score your adventures like movies. Be a maestro!


THING PICTURES (OR TERRAIN & CREATURES)
CHANGE PAINT COLOR
DRAW ANOTHER COLOR
EXIT
EDIT ANOTHER PICTURE

No arms control here! Endless weapons of your design. (Endless armor & cures, fortunately.)



RIVERS OF LIGHT

ARE WE EACH DESTINED TO LIVE FOR ONE BRIEF LIFETIME? CAN ANY PERSON LIVE ETERNALLY, OR LIVE AGAIN? THERE ARE SOME IN THE OLD WORLDS OF BABYLONIA AND EGYPT WHO PROFESS TO KNOW THESE ANSWERS. YOU MAY MEET THEM ON YOUR OWN QUEST FOR ETERNAL LIFE.

PRESS BUTTON TO CONTINUE.

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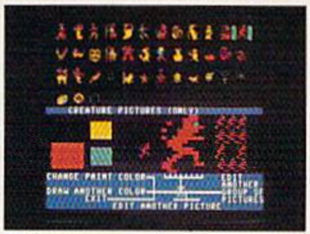
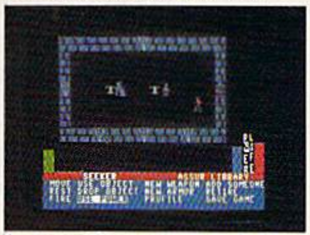
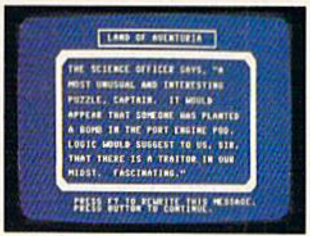

CREATURE PICTURES (ONLY)
CHANGE PAINT COLOR
DRAW ANOTHER COLOR
EXIT
EDIT ANOTHER PICTURE

500 obnoxious creatures thrown in! Or make your own. Point 'em at the population! See their priorities!


SEEKER
ASSUR LIBRARY

You get magic! 31 variations on 15 Big Spells! You get technology. You get religion. All right!



LAND OF ADVENTURIA

THE SCIENCE OFFICER SAYS, "A MOST UNUSUAL AND INTERESTING PUZZLE, CAPTAIN. IT WOULD APPEAR THAT SOMEONE HAS PLANTED A BOMB IN THE PORT ENGINE POD. LOGIC WOULD SUGGEST TO US, SIR, THAT THERE IS A TRAITOR IN OUR MIDST. FASCINATING."

PRESS F7 TO REWRITE THIS MESSAGE.
PRESS BUTTON TO CONTINUE.

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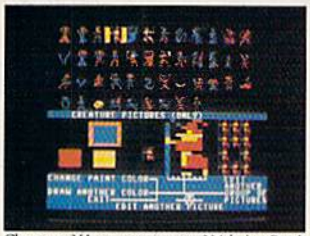
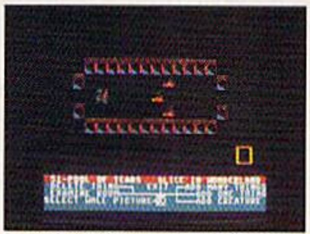
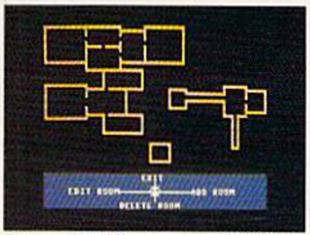

CREATURE PICTURES (ONLY)
CHANGE PAINT COLOR
DRAW ANOTHER COLOR
EXIT
EDIT ANOTHER PICTURE

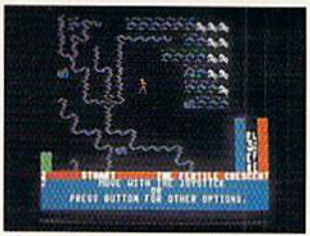
Characters? How many you want? Make 'em. Break 'em. Cast them into the world without a dime!



7 tutorial mini-adventures included! Generously survivable for those tentative first timers!


EXIT
EDIT ROOM
ADD ROOM
DELETE ROOM

Design up to 15 different regions with 16 different rooms in each one. Space out!


THE FERTILE CRESCENT
MOVE WITH THE JOYSTICK
PRESS BUTTON FOR OTHER OPTIONS.

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To close one or all open files on a specific device, you can use DClose. The syntax for this command is

DCLOSE <#lfn ON, Un>

where, again, lfn is the logical file number and Un is used to specify at which device to direct the command. DClear is used to clear all open channels and all open files. It is equivalent to the Initialize command in C-64 Basic 2.0. The DClear syntax is

DCLEAR <Dn ON, Un>

The Basic 2.0 Close command functions as before and is used to close a specific logical file number.

Autobooting Programs

Another new feature of the C-128 is its ability to autoboot programs on specially prepared disks that are in the drive when the computer is first turned on. This allows application software to load and run itself without the user being required to do anything except turn on the computer. You can also use this feature in your own programs to customize the computer on power-up. You may choose whatever color combination you like best. For example, you can define the programmable function keys to meet your requirements every time you turn on the computer.

To cause a program to autoboot, the program—Basic or machine language—must first be present on the disk. The key, however, is what the computer finds on track 1, sector 0. Whenever the computer is turned on, it reads track 1, sector 0, looking for a special data pattern in much the same way it does when a cartridge is plugged into the machine. If that information is present, the data at track 1, sector 0 is read into the computer at $0B00 (2816). As part of system initialization, that data, if present, is executed.

The format of the data at track 1, sector 0 is very specific. The first three bytes must be the letters CBM, followed by CHR$(0) repeated four times. Next is an optional booting message, which can be up to 16 characters long, followed by two more CHR$(0)s.

After that are machine language instructions that point to the address of the Run or Boot command and execute that command. The address used is in low-byte/high-byte form and is calculated by adding to 2186 the length of the booting message plus 15. The low byte is that address combined with 255 by the And command; the high byte is the calculated address divided by 256. The machine language instructions are CHR$(162), CHR$(low byte), CHR$(160), CHR$(high byte), CHR$(76), CHR$(165) and CHR$(174).

Next is the string RUN"filename" or BOOT"filename," followed by CHR$(0). The Run command is used if a Basic program is loaded and run, and BOOT is used if a machine language program is loaded and executed.

Autoboot Maker

Since this can be quite a tedious task every time you want to make an autoboot disk, we have written an autoboot maker utility program for the C-128.

Autoboot Maker (Listing 1) effortlessly writes that special sequence of data to track 1, sector 0. The program asks you for a booting message as well as the name of the program to autoboot. It also asks if the program is Basic or machine language and sets up the disk accordingly.

To protect you from overwriting a previously created autoboot disk, the program checks to see if the special data sequence is already present. If so, you are given the option to quit or to rewrite the autoboot code. Furthermore, to protect you from overwriting the autoboot sequence, the BAM (block allocation map) is updated to inform the disk drive that all of track 1 is being used, and it should not write any new data there. This results in the loss of 20 disk blocks (out of 1328). However, if you use the Collect command on an autoboot disk, it will make track 1 available for data storage, and the autoboot code could be destroyed.

Carefully type in the Autoboot Maker program and save it to disk before running it. When you run it the first time, the screen will go blank for a while, as the C-128 goes into Fast mode and draws the graphics screen. After about 20 seconds, the screen is saved to disk under the names AUTO.PIC and AUTO.COL. On subsequent runs, the graphics screen will load up directly from disk. On the 1571, this takes about three seconds to load.

You are then prompted to insert a disk to which the autoboot code is to be written. You must already have saved onto your disk a 128-mode program that you want autobooted *before* you run Autoboot Maker. You will be prompted for all needed information, and the customized autoboot code will be quickly written to your disk.

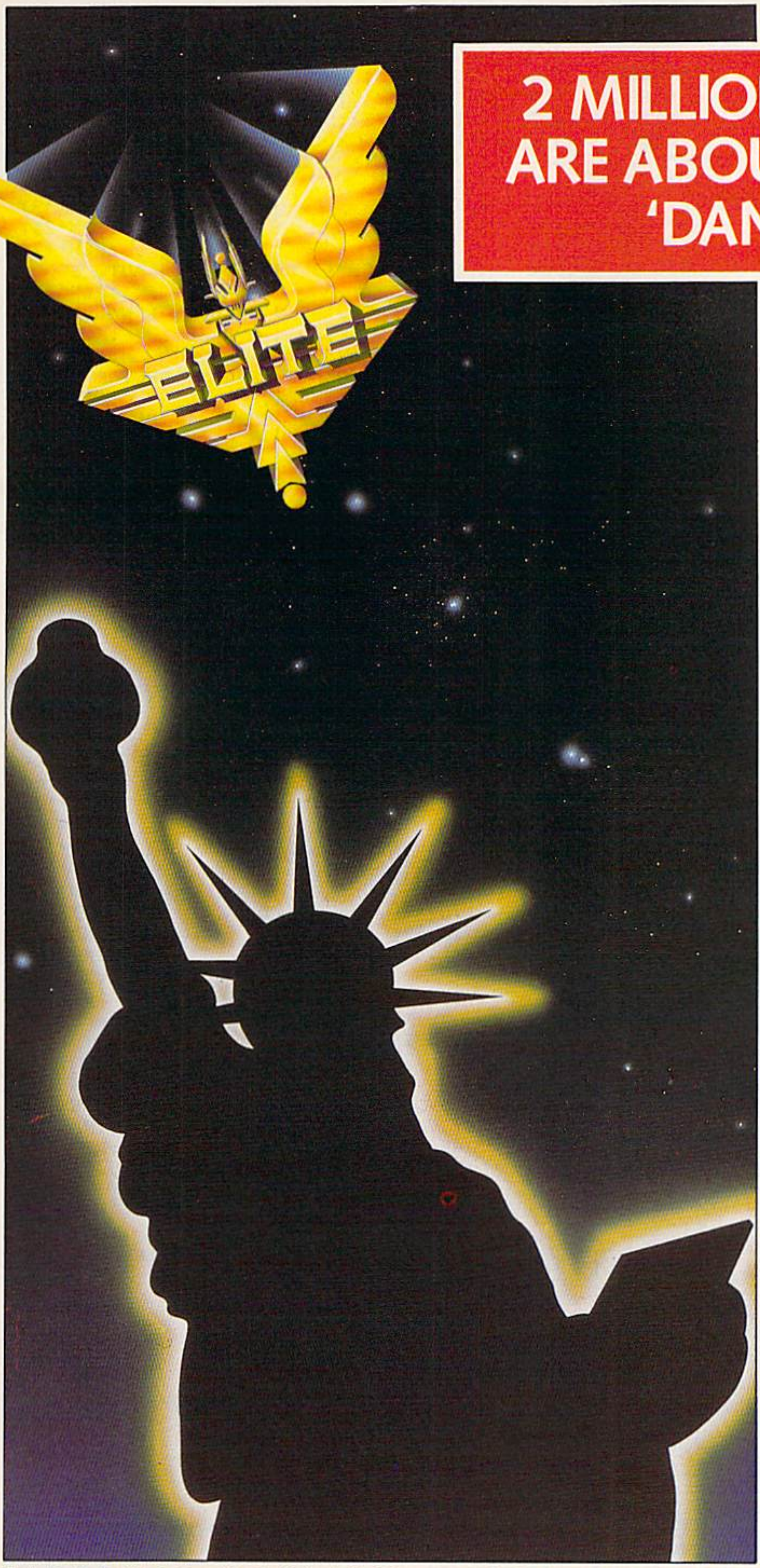
Autobooting disks is one of the ways the C-128 has made disk control user-friendly. Use it to customize the computer to your specifications. Now, all you'll have to do is place your specially prepared Autoboot-made disk into the 1571 drive and then turn on your C-128. Your program will automatically load and run. This would be particularly useful if you had a menu or a disk directory program that was autobooted. R

Address all author correspondence to Louis R. Wallace, 6124B SW 11 Place, Gainesville, FL 32607.

Listing 1. *Autoboot Maker program.*

```
10 REM C128 AUTOBOOT DISK MAKER       :REM*80
20 COLOR1,1:COLOR0,6:COLOR4,6          :REM*6
30 GRAPHIC1,1                         :REM*12
40 RENAME"AUTO.PIC" TO "AUTO.PIC"     :REM*58
50 E$=LEFT$(DS$,2)                    :REM*76
60 IFE$<>"63"THENGOSUB620:ELSE BLOAD"AUTO.C
   OL",D0:BLOAD"AUTO.PIC",D0          :REM*12
70 CLR:GOTO500                       :REM*236
80 REM INSERT DISK                   :REM*242
90 S1$=" INSERT DISK TO AUTOBOOT"    :REM*230
100 S2$="PRESS SPACEBAR WHEN READY.":GOSUB8
    20                                 :REM*64
110 DO:GETKEY A$:LOOP UNTIL A$=" ":GOSUB850
                                      :REM*214
120 RETURN                            :REM*178
130 REM CHECK TRACK 1 SECTOR 0 FOR DATA ALR
    EADY THERE                        :REM*148
140 OPEN1,8,15:OPEN2,8,2,"#":GOSUB480
                                      :REM*106
150 PRINT#1,"U1:";2;0;1;0              :REM*46
160 GET#2,A$:GET#2,B$:IFASC(A$+CHR$(0))<>0O
    RASC(B$+CHR$(0))<>0THEN GOSUB190
                                      :REM*196
170 CLOSE2:CLOSE1:RETURN              :REM*110
180 REM REWRITE AUTO BOOT (Y/N)        :REM*88
190 S1$="ALREADY AN AUTOBOOT DISK!" :REM*64
```

→



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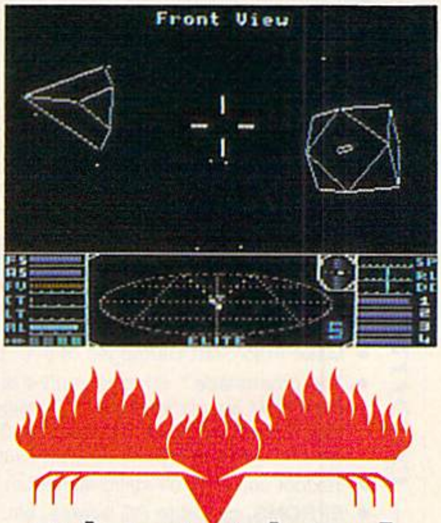

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Listing 1 continued.

```
200 S2$="SHOULD I CONTINUE? (Y/N)":GOSUB820
                                :REM*156
210 GETKEY A$                   :REM*192
220 IFA$="Y"THEN GF=1:GOSUB850:RETURN
                                :REM*100
230 IFA$="N"THEN GOSUB 850:CHAR1,7,6,"{6 SP
    ACEs}PROGRAM STOPPED",1:CLOSE2:CLOSE1:S
    LEEP5:GRAPHIC0:COLOR5,14:END:ELSE GOTO2
    10                          :REM*142
240 REM WRITE TRACK 1, SECTOR 0.  :REM*232
250 S1$="{3 SPACEs}ENTER BOOTUP MESSAGE":S2
    $="":GOSUB820                :REM*68
260 DN$="":GOSUB890:DN$=W$       :REM*75
270 GOSUB850:S1$="ARE YOU BOOTING A BASIC O
    R"                           :REM*21
280 S2$="{5 SPACEs}ML PROGRAM (B/M){5 SPACE
    s}":GOSUB820                :REM*223
290 GETKEY A$                    :REM*17
300 IF A$="B" OR A$="{SHFT B}" THEN ML=0:GO
    SUB850:GOTO 320             :REM*171
310 IF A$="M" OR A$="{SHFT M}" THEN ML=1:GO
    SUB850:ELSE GOTO290          :REM*45
320 GOSUB850:S1$="{3 SPACEs}PROGRAM TO AUTO
     BOOT?":S2$="":GOSUB820     :REM*229
330 NM$="":GOSUB890:NM$=W$:IFLEN(NM$)=0THEN
    330                         :REM*215
340 GOSUB850:CHAR1,7,6,"WRITING AUTO BOOT..
    .",1                          :REM*5
350 ML$="CBM"+CHR$(0)+CHR$(0)+CHR$(0)+CHR$(
    0)+DN$+CHR$(0)+CHR$(0)+CHR$(162):REM*83
360 AD=2816+LEN(DN$)+15          :REM*19
370 ML$=ML$+CHR$(ADAND255)+CHR$(160)+CHR$(A
    D/256)+CHR$(76)+CHR$(165)   :REM*139
380 ML$=ML$+CHR$(175)           :REM*223
390 IF ML=0 THEN ML$=ML$+"RUN"  :REM*147
400 IF ML=1 THEN ML$=ML$+"BOOT"  :REM*21
410 ML$=ML$+CHR$(34)+NM$+CHR$(0)    :REM*107
420 OPEN1,8,15:OPEN2,8,2,"#":GOSUB480
                                    :REM*131
430 PRINT#1,"B-P:";2;0              :REM*133
440 PRINT#2,ML$;                    :REM*123
450 PRINT#1,"U2:";2;0;1;0:GOSUB480  :REM*137
460 CLOSE2:CLOSE1:RETURN            :REM*145
470 REM READ ERROR CHANNEL           :REM*93
480 IFDS>1THENGRAPHIC0,1:PRINTDS$:CLOSE2:CL
    OSE1:END                         :REM*23
490 RETURN                           :REM*37
500 REM MAIN BODY                   :REM*207
510 GF=0                            :REM*129
520 COLOR1,7:S1$="{3 SPACEs}C128 AUTO BOOT
    MAKER"                          :REM*218
530 S2$="{2 SPACEs}BY D DARUS & L WALLACE":
    GOSUB820:SLEEP5                 :REM*222
540 GOSUB80:REM INSERT DISK         :REM*156
550 GOSUB140:REM CHECK TRACK 1 SECTOR 0 FOR
     DATA ALREADY THERE.            :REM*134
560 GOSUB250:REM WRITE TRACK 1, SECTOR 0.
                                    :REM*126
570 IFGF=1THEN610                   :REM*214
580 OPEN1,8,15:FORT=0TO20:PRINT#1,"B-A:" 0;
    1;T:NEXT                         :REM*18
590 IFDS=65THENGOSUB190:GOTO610       :REM*2
600 IFDS>0THENPRINTDS$              :REM*136
610 CLOSE1:S1$="ALL DONE!":S2$="PRESS ANY K
    EY TO END":GOSUB850:GOSUB820:GETKEY A$:
    GRAPHIC0,1:COLOR5,14:END        :REM*234
620 FAST:GRAPHIC1,1:COLOR1,3        :REM*110
630 CHAR1,13,2,"AUTODISK MAKER"     :REM*104
640 COLOR1,1                        :REM*148
650 BOX1,40,32,280,186              :REM*180
660 CIRCLE1,160,105,32,25           :REM*152
670 CIRCLE1,160,150,8,5,270,90      :REM*124
680 DRAW1,152,150 TO 152,170        :REM*196
690 DRAW1,168,150 TO 168,170         :REM*82
700 CIRCLE1,160,170,8,5,90,270      :REM*148
710 CIRCLE1,195,125,5,4              :REM*60
720 BOX1,276,63,280,70              :REM*130
730 DRAW0,280,64 TO 280,69          :REM*168
740 COLOR1,7                        :REM*184
750 BOX1,56,40,264,71,,1             :REM*58
760 COLOR1,1                         :REM*12
770 PAINT1,45,40                     :REM*79
780 SLOW                             :REM*61
790 BSAVE"AUTO.PIC",B0,D0,P8192 TO P16191
                                    :REM*113
800 BSAVE"AUTO.COL",B0,D0,P7168 TO P8191
                                    :REM*107
810 RETURN                          :REM*103
820 CHAR1,7,5,S1$,1                  :REM*51
830 CHAR1,7,7,S2$,1                  :REM*67
840 RETURN                          :REM*133
850 COLOR1,7:CHAR1,7,5,"{26 SPACEs}",1: REM
     26 SPACES                       :REM*13
860 CHAR1,7,6,"{26 SPACEs}",1: REM 26 SPACE
    S                               :REM*155
870 CHAR1,7,7,"{26 SPACEs}",1: REM 26 SPACE
    S                                :REM*37
880 RETURN                          :REM*173
890 CT=0:XP=7:TX$="":W$=""          :REM*109
900 GETKEY TX$                       :REM*57
910 A=ASC(TX$)                       :REM*87
920 IFA=13THENRETURN                 :REM*83
930 IFA=20ANDLEN(W$)>0THENW$=LEFT$(W$,LEN(W
    $)-1):TX$=" ":GOTO980            :REM*15
940 IFA=20THEN900                   :REM*147
950 IFA$=CHR$(34)THEN900            :REM*179
960 IFLEN(W$) >=16 THEN900          :REM*109
970 XP=XP+1:W$=W$+TX$               :REM*131
980 CHAR1,XP,7,TX$,1:IFA=20THENXP=XP-1
                                    :REM*105
990 GOTO900                         :REM*219
```

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CP/M and the C-128

Explore the C-128's CP/M 3.0. This tutorial discusses two data-storage techniques, CP/M's resident commands and how to copy system files.

By ALEX LANE

"Okay," some of you new CP/M users are saying to yourselves as you and the A> prompt face off over your C-128, "so what do I do now?"

Others of you may have heard that CP/M is hard to learn and have therefore skipped trying out CP/M until "later."

Well, if you've never played around with CP/M or any other operating system, the A> prompt on your video screen can be pretty intimidating the first time you are faced with it. However, as you learn about CP/M, taking one small step after another, that A> rapidly loses its menace.

First Steps

Loading CP/M into your C-128 is fairly simple. The chances are that everything you have already connected to your C-128 is sufficient for you to run CP/M, but let's run down the checklist, just in case you have any doubts.

In addition to the C-128 itself, you'll need a disk drive. If you already own a 1541, that will do for now; later, you might consider moving up to a 1571, which is faster and capable of reading different formats.

If you're using a television set as a video display for your C-128, you will only be able to run CP/M in 40-column mode and will have to scroll across the screen using the control key along with the cursor-left and cursor-right keys. To get the maximum out of the C-128's CP/M mode, however, I strongly suggest you get an inexpensive (less then $100) monochrome monitor, which gives you the benefit of all 80 columns.

Finally, you need a disk called a system disk, which contains the CP/M operating system.

MFM versus GCR

With the C-128 in CP/M mode, the new 1571 disk drive is capable of reading disks with information that has been stored using either the GCR (group code recording) or MFM (modified frequency modulation) data-storage techniques. There has been a lot of confusion about these techniques, with some people worrying about whether or not their 128 can run various CP/M packages.

GCR and MFM refer to the way the disk hardware stores information on a disk. The details of how this is done are not important, but you should be aware that the 1541 drive can only use the GCR method to store and retrieve disk information, while the 1571 can use either the GCR or MFM method.

The method used to store a program has absolutely no effect on whether the program will or will not run on the C-128. In other words, you can copy CP/M programs from an MFM disk on a 1571 to a GCR disk on a 1541 without any problems. I've heard some people talking about "GCR programs" and "MFM programs"; to me, this makes about as much sense as describing a song being played on the radio as an "AM song" or an "FM song."

The CP/M disk that came with the C-128 was written onto the disk using the GCR technique. I hesitate to use the term "GCR format," because "format" is better reserved for a discussion about how data is organized on the disk in tracks and sectors; more about that some other time.

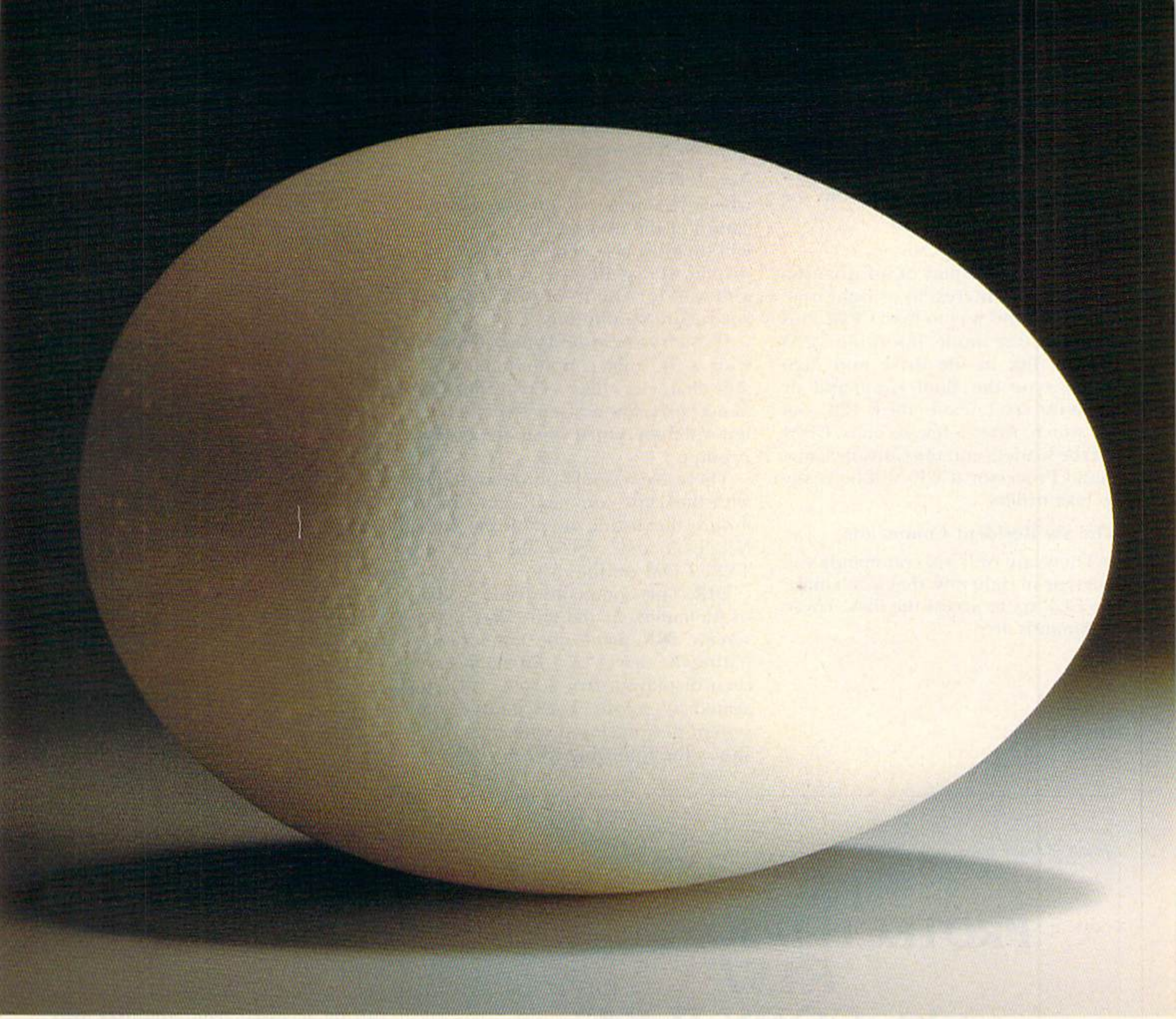
Having been stored using GCR, the software can be read by both the 1541 and 1571 disk drives, making CP/M available to C-128 owners, no matter which drive they own.

Booting the System Disk

Instead of residing in a read-only memory (ROM) chip inside the computer, the CP/M operating system must be loaded from disk every time it is to be used. The C-128's CP/M Plus can be booted in either of two ways.

RUN It Right

C-128 (in CP/M mode)



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The first way is to turn on the disk drive, insert the CP/M system disk and turn on the C-128. The computer will automatically scan the disk in the drive and, having found the CP/M system tracks, will load them into memory while a message on the screen announces

```
BOOTING CP/M PLUS
```

followed by a display of information that is of no interest to us right now.

The second way to load CP/M Plus is from C-128 mode. Insert the CP/M system disk in the drive and then either type the Boot command or press the reset next to the C-128's on/off switch. After a few seconds, CP/M will be loaded, and the Console Command Processor (CCP) will be ready to take orders.

The Six Resident Commands

There are only six commands you can type in right now that won't make the CCP try to access the disk. These commands are:

TYPE
DIR
USER
DIRSYS
RENAME
ERASE

Let's quickly see what these commands do.

TYPE. If you have a file made up of printable characters, you can list these to the screen by entering

```
A>  TYPE filename <return>
```

where "filename" is the file specification of the desired file. CP/M Plus will then list a screen's worth of file, display "Press Return to Continue" and wait for you to press the return key before continuing.

If you try to use the Type command with a file that contains non-printable characters (like a COM file), CP/M may list a few nonsense characters, but will then return you to the system prompt.

There are several options available with the Type command, most commonly the listing of multiple files; but to do that, you'll need the file TYPE.COM on the disk.

DIR. This command displays a list of filenames. At the left edge of the screen, DIR prints the letter designating the drive ("A"). Filenames are then displayed, five across and separated by colons. For example, the system disk enclosed with the C-128 shows the following directory:

```
A: CPM+      SYS : CCP      COM : HELP
   COM : HELP      HLP : KEYFIG      COM
A: KEYFIG   HLP : FORMAT   COM : PIP
   COM : DIR      COM : COPYSIS      COM
```

With DIR, there are a lot of bells and whistles that can be called forth, including lists that show the time and date a file was created or updated, its protection status and other features; but these require the file DIR.COM to reside on the disk.

USER. This command lets you change from one user area to another. The default user area (the one the system leaves you in after it's finished booting) is area 0.

Changing user areas is simple. For example, from the A> prompt, type:

```
A> USER 1<return>
```

You should now see a prompt that reads: 1A>.

Now type DIR again; this time, the response is: "No File," which should tell you that all the files in area 0 are invisible to a user in area 1. Now type:

```
1A> USER 0<return>
```

You'll be back at the A> prompt, and DIR will work as before.

The User command lets you organize your files into as many as 16 groups. This is handy if you have many small (1–2K) files on a disk and don't want to hunt through them all every time you invoke DIR.

DIRSYS. Another way CP/M Plus lets you organize and protect your files is by letting you assign them attributes. Some files can be assigned a system (SYS) attribute, which means that (if they're in user area 0) they can be accessed from any user area on the same drive.

Just as files in other user areas don't show up when you call for a directory, files with the SYS attribute don't either. DIRSYS lets you locate any system files from any user area.

ERASE. This command, followed by a filename, causes the file to be deleted from the directory. (One of the first public domain programs you might want is UNERA.COM, which finds deleted entries and tries to restore the original file.)

As with DIR, there are a number of options available, but these require assistance from a disk file.

RENAME. This command is followed by two filenames separated by an equals (=) sign. For example,

```
A> RENAME NEWFILE=OLDFILE
<return>
```

will cause the file named Oldfile to be renamed Newfile.

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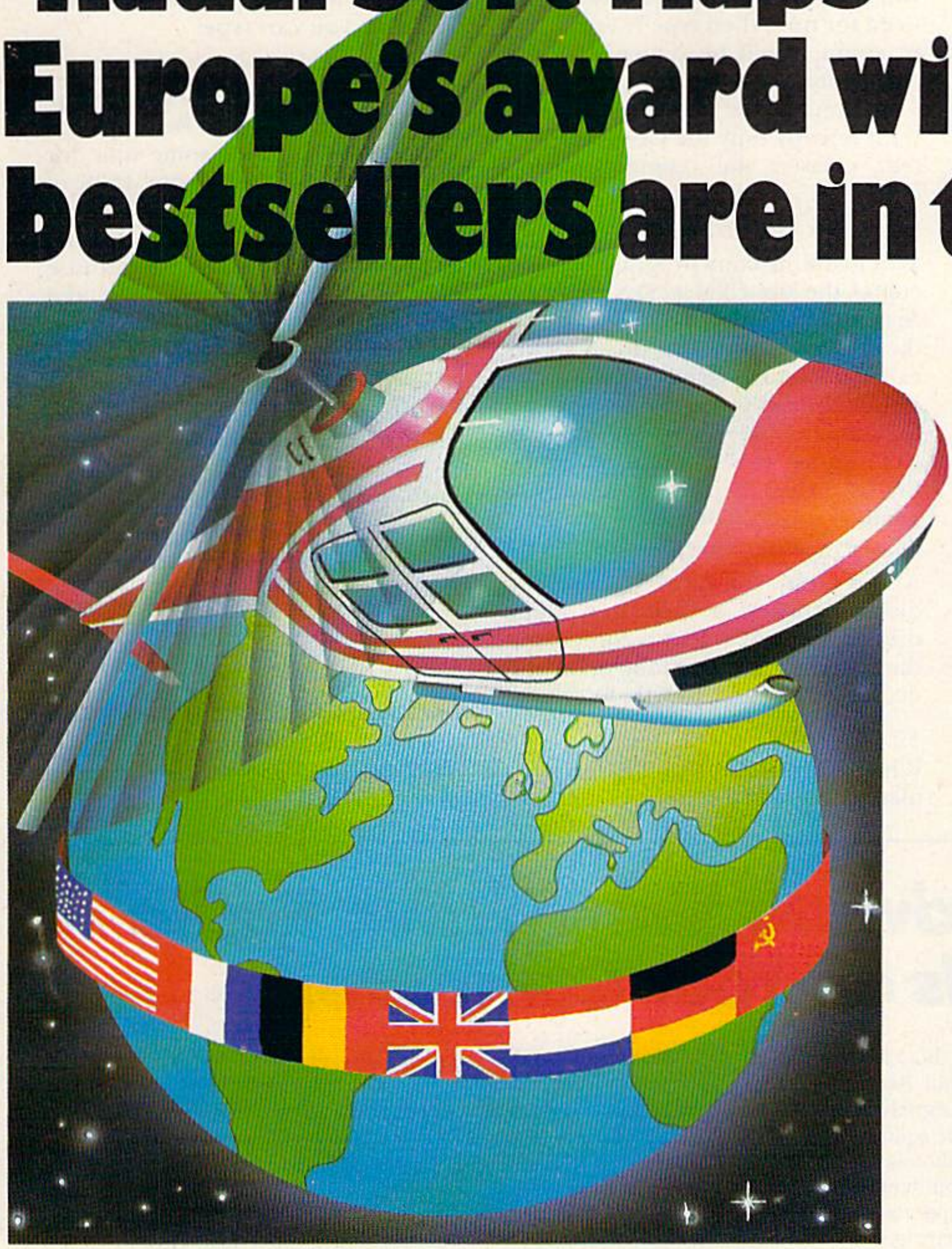
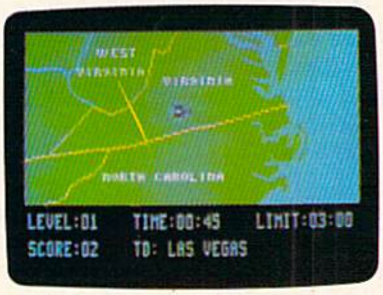
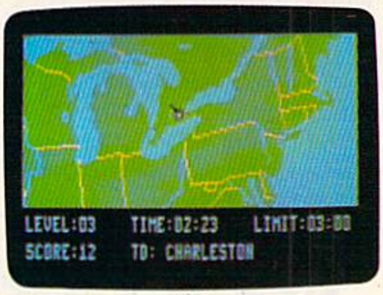
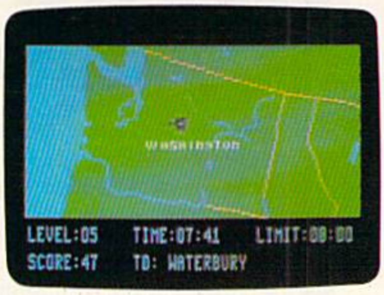




```
LEVEL:01   TIME:00:45   LIMIT:03:00
SCORE:02   TO: LAS VEGAS
```



```
LEVEL:03   TIME:02:23   LIMIT:03:00
SCORE:12   TO: CHARLESTON
```



```
LEVEL:05   TIME:07:41   LIMIT:08:00
SCORE:47   TO: WATERBURY
```

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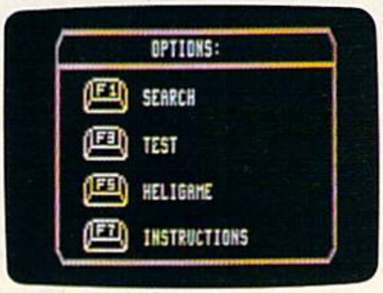

```
OPTIONS:
F1  SEARCH
F3  TEST
F5  HELIGAME
F7  INSTRUCTIONS
```

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As with DIR and Erase, you can ask for options, but you need a disk file to handle them.

Creating a System Disk

Before you begin experimenting with CP/M Plus, create another system disk using as a model the one that came with your C-128. While you're at it (and if you have the time), it might not be a bad idea to back up the software entirely!

Settling down with a couple of blank disks by your side and the system disk in the drive, type:

```
A>  FORMAT<return>
```

Since the CCP doesn't understand the command "FORMAT," it will try to find a .COM file on the disk with the same name. Once found, the program will be loaded into memory and begin to run automatically.

Once everything settles down, the program will display the type of drive attached to the system, as well as your formatting options. Use the cursor-up and cursor-down keys to make your choice (either C-128 single-sided or, if you have a 1571, C-128 double-sided); then press the return key, remove the CP/M Plus system disk, insert a blank disk and press $.

After a few minutes, the program will ask if you want to format another disk. Repeat the foregoing drill until you've formatted all the disks you'll need for now; then type N to exit the program. You'll be returned to the A> prompt.

Assuming for the moment you want to copy only the CP/M Plus system, reinsert the system disk and enter:

```
A> PIP E:=A:CPM+.SYS<return>
```

This loads the copy program PIP and copies the file CPM+.SYS from the A: drive to an imaginary drive, called the E: drive. (In reality, this E: drive, called a "virtual" drive, is an identity assumed temporarily by the A: drive for the purpose of copying files.)

If you use a 1541 drive, while the file is being copied, you will be prompted once with:

```
INSERT DISK E IN DRIVE A
```

At this point, you remove the system disk and insert a formatted blank disk. Once CPM+.SYS is copied, put the system disk back in the drive and do the same for CCP.COM by typing:

```
A> PIP E:=A:CCP.COM<return>
```

When you're done, you'll have a complete copy of the system.

Now, if you want to copy the entire disk, you can use the PIP command with each file. If you want to save wear and tear on your fingers from the start, you can type:

```
A> PIP E:=A:*.*<return>
```

This will cause all the files to be copied, one after the other. Be prepared, however, to set aside some time for this. It takes a while to copy 160K of files. Note: Don't issue the PIP E:=A:*.* command after copying CPM+.SYS and CCP.COM, because PIP will do exactly as you say and copy everything, including a second copy of CPM+.SYS and CCP.COM!

Parting Words

CP/M isn't something you master in one session, and we've only managed to scratch its surface. However, you've come a long way; that A> prompt doesn't look so intimidating anymore, does it? R

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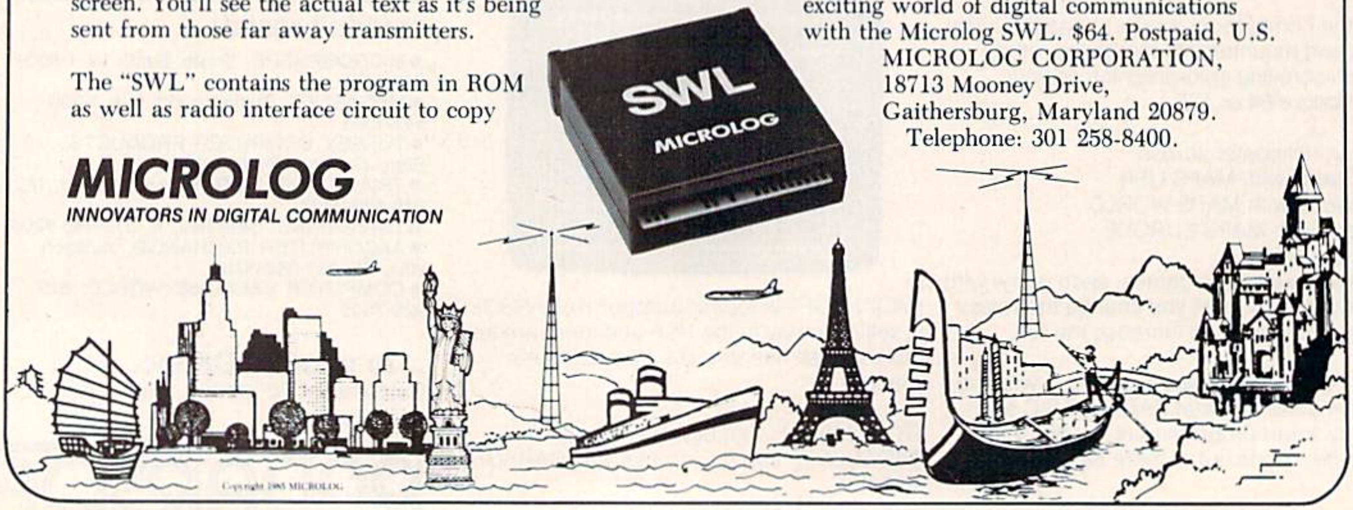

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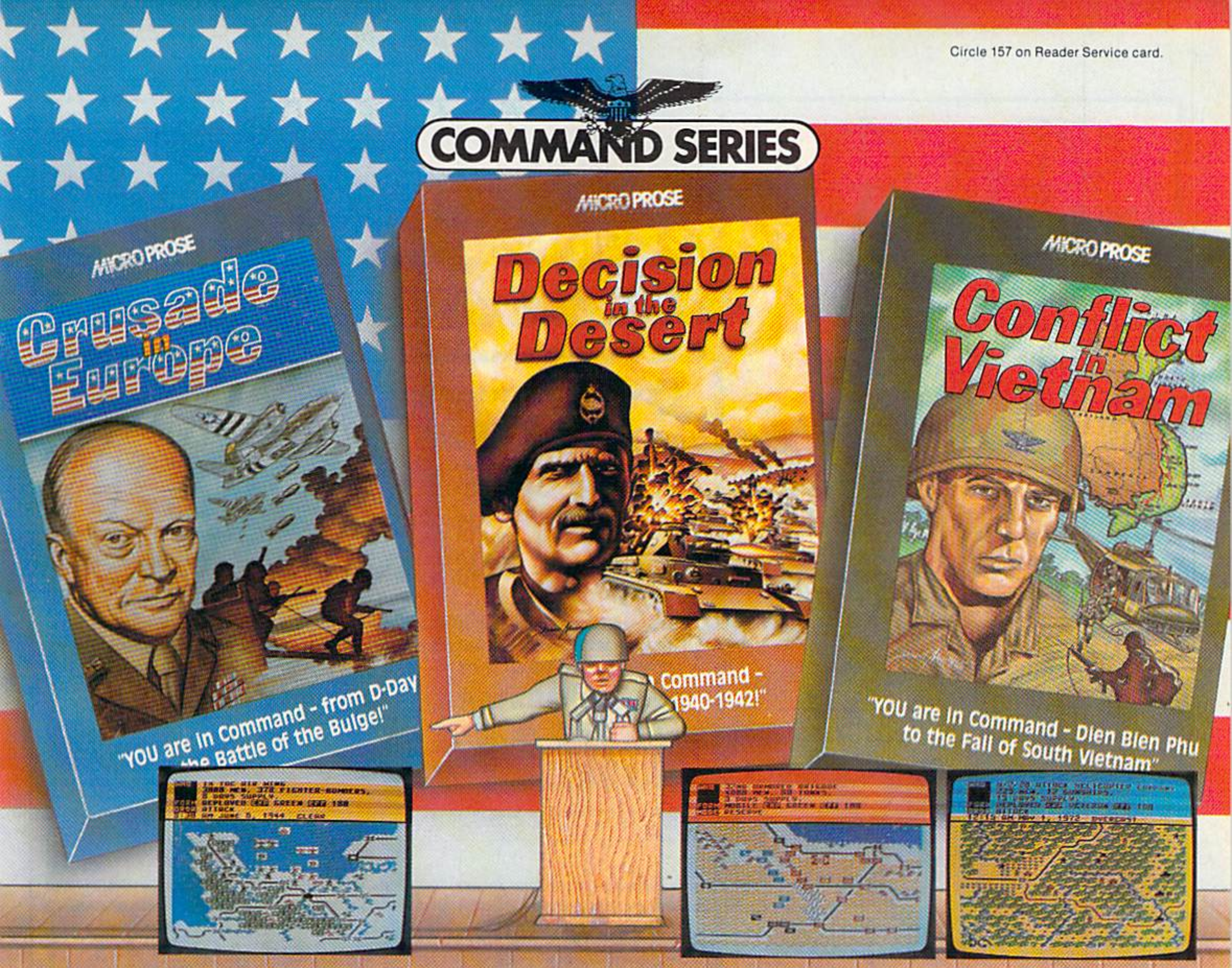
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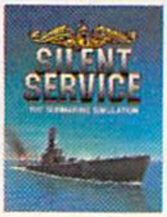

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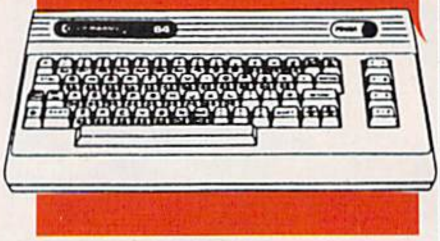

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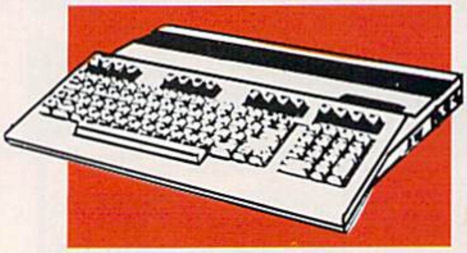

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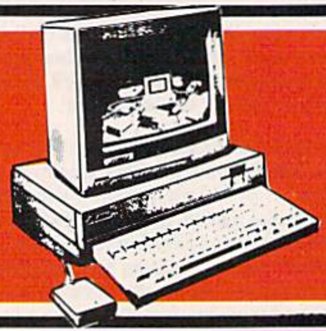

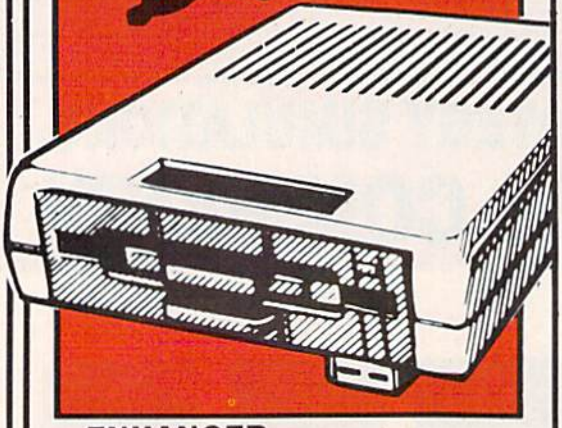

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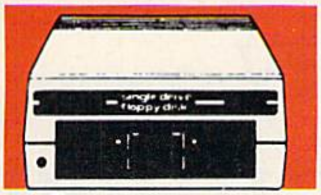

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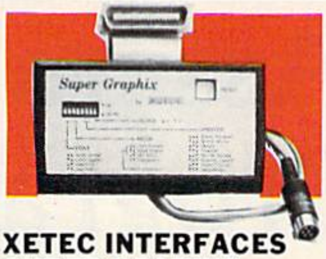

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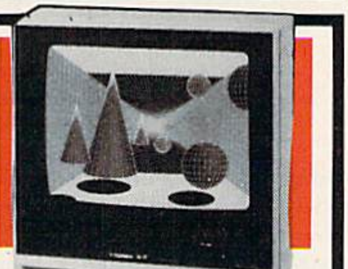

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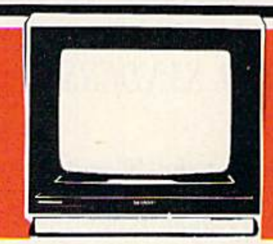

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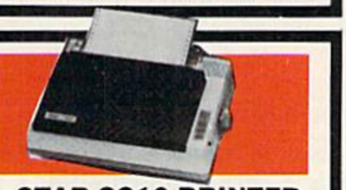

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C-128 Assembly Language Programming

Do you want to program in a language other than Basic? Well, with the new C-128's built-in machine language monitor, you can program in assembly language.

By WILLIAM B. SANDERS

For machine and assembly language programmers, the C-128's nicest feature is its built-in monitor. In this article, I'll explain how to use the monitor's mini-assembler.

To begin, either press the shifted f8 key or type in

```
MONITOR <return>
```

You will now be in the monitor. When you enter the monitor, the major registers are displayed. For example, your screen may look like this:

```
MONITOR
     PC     SR   AC   XR   YR   SP
;  FB000    00   00   00   00   F9
```

What does that mean? Let's take it one step at a time:

PC—Program counter. The value of the program counter is $FB000. In the C-128 monitor, the left-most value in a five-digit hexadecimal number is called the bank. The other values represent the address in that bank. The $B000 is where the built-in monitor resides.

SR—Status register. This tells the conditions of seven one-bit flags. At the outset, they are all cleared, or are of 0 value.

AC—This is the accumulator, or A register.

XR/YR—These are the X and Y registers.

SP—The stack pointer holds the pointer to the return address for subroutine jumps.

It is important to understand that all default values in the 128 monitor mini-assembler are in hexadecimal. To enter a decimal value, you must place a plus sign (+) in front of the value; this changes the number into hexadecimal form. For example, let's say you want to enter decimal 15. You would enter:

```
+15
```

and it would be changed to:

```
0F
```

This is simply the hexadecimal equivalent of decimal 15.

To convert a number to a different base *while in the monitor*, you need only enter the symbol for the base of the number you wish to convert and press the return key. Use these symbols for your base conversion:

$ = hexadecimal
+ = decimal
& = octal
% = binary

You can begin with any base and convert to any other base as long as the number you enter is "legal." Thus, while &77 is a perfectly legal octal number, &88 is not, nor is any digit other than 0 or 1 in a binary number.

Type in the following to see how it works.

```
$1300 <return>
```

You will be presented with:

```
$1300
+4864
&11400
%1001100000000
```

In examining the contents of registers and sprite configurations, the binary conversion will be very useful.

Assembling Programs

To assemble programs using mnemonic opcodes, enter:

```
A <address> <opcode> <operand>
```

For example, to enter programs in the C-128 mode, you might start as follows:

```
A F1300 LDA  #0D <return>
```

As soon as you press the return key, your code will look like this:

```
A F1300 AD 0D   LDA #$0D
A F1302
```

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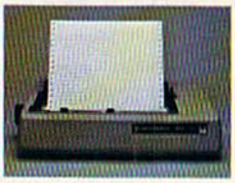

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The "AD 0D" are the machine language hexadecimal values for LDA and 0D. The next available address, F1302, is then given for entering the next set of opcodes and operands.

Using the Correct Banks

When you enter code in the monitor, you enter it in one of 16 banks ($0–$F). The left-most value in an address is the bank value. For example, in F1300, the address is 1300 in bank F. The organization of information in bank F is not the same as in bank 0. The default bank when you turn on your C-128 is bank $F, but when you enter code in the monitor, failure to enter the fifth value for an address puts you in bank 0. When writing programs in the C-128 mini-assembler, use bank $F (15) for the C-128 mode and bank $0 (0) for the C-64 mode.

Programming for the C-128 Mode

While many of the addresses used for the C-128 are the same as the ones used in the C-64, some are different. For example, in the C-64 mode, the pointers for the beginning of a Basic program are $2B and $2C, while in the C-128 mode, they're $2D and $2E. Similarly, the often-used jump to $E544 is accomplished with a JSR to $C000 in the C-128 mode, and the free RAM at $C000 (49152) in the C-64 is not free in C-128 mode.

The most important consideration for programming in the C-128 mode is to access bank F by entering F as the first of the five hex values when you initially begin assembling your code.

Second, begin your programs at F1300, *not* at FC000 or F8000 or (even worse) $C000 or $8000. In the 128 mode, the SYS value from Basic is to $1300 (4864). It is unnecessary to indicate bank F, since, from Basic in the C-128 mode, the default bank *is* $F. Once you've entered your first line, you needn't continue entering the bank, as this is done automatically.

In referencing addresses from within the assembly language program, you do not have to reference banks for the level we are discussing. The following shows the correct and incorrect way to reference addresses using the mini-assembler. First, the incorrect way:

```
A F130E STA F1404
```

Now, the correct way:

```
A F130E STA 1404
```

Nothing works better than an example, so let's see if we can do something simple and clear. To start off, enter:

```
A F1300 JSR C000 <return>
```

After the first line, the next available address will come up. Here's the complete program:

```
A  F1300  JSR   C000  (clear the screen)
A  F1303  LDA   #52   (load first letter)
A  F1305  JSR   FFD2  (output to screen)
A  F1308  LDA   #55   (second letter)
A  F130A  JSR   FFD2  (output to screen)
A  F130D  LDA   #4E   (third letter)
A  F130F  JSR   FFD2  (output to screen)
A  F1312  RTS         (get back)
```

When you're all finished, your listing will appear as follows:

```
.  F1300  20   00   C0  JSR   $C000
.  F1303  A9   52       LDA   #$52
.  F1305  20   D2   FF  JSR   $FFD2
.  F1308  A9   55       LDA   #$55
.  F130A  20   D2   FF  JSR   $FFD2
.  F130D  A9   4E       LDA   #$4E
.  F130F  20   D2   FF  JSR   $FFD2
.  F1312  RTS
```

There are two ways to execute your program. First, you can exit to Basic with an X <return> and SYS 4864; or, from within the monitor, you can execute the program by entering G F1300. Try it both ways to see what happens. (You get a Syntax error from monitor execution, but don't worry about it; there's nothing wrong.)

Now, let's save and load a program from within the monitor, and I'll show you a neat trick for getting all of your C-64 programs into the C-128 mode. To save a program from within the monitor, you use the S command with the device number. That's very much like the old C-64 Save mode. However, with machine and assembly language programs, you have to include the beginning address and the ending address *plus* 1. Using the example program, you would enter:

```
S"HOTSTUFF",8,F1300,F1313 <return>
```

Saving to disk, you use device number 8. For cassette storage, you would have used a 1. The program begins at F1300 and ends at F1312. The beginning address stays the same, but you add 1 to the ending address to get F1313. Let's call the program "HOTSTUFF."

To get the program back, you just have to indicate the program name and device number. Unless you want it to load at a different address than the one you used for storage, you don't have to add the load address. So, clear that portion of memory you used by entering:

```
F F1300 F1312 FF
```

That will fill (F) the part of memory you used with $FFs (255s). Now you'll know whether the program you load is really the one you saved. Enter the following:

```
L"HOTSTUFF",8 <return>
```

Now enter:

```
D F1300 <return>
```

to disassemble (D) your code and see if you recovered the program. If you did not, go back and try again.

Transferring Between the C-128 and C-64 Modes

Keeping the program in memory, try the following:

```
T F1300 F1312 0C000
```

That transfers (T) the memory contents of $F1300–$F1312 to memory beginning at $0C000. Not only can you transfer from one part of memory to another, you can transfer from one bank to another. Since $C000 is free RAM for the C-64, the program should execute in the C-64 mode. But wait! The first JSR is to $C000; so let's change the $C000 to $E544. Here's how.

First disassemble the code at $0C000 with D C000 <return>. (You don't have to put in the bank number, since it defaults to bank 0.) Then, using your arrow keys, move the cursor up so that it is over the $C000 in the program and change it to $E544. Now, you are all set to execute the same code in the C-64 mode. To get to the C-64 mode, don't return to Basic and enter GO 64. Anyone can do that. Enter the following:

```
G FFF4D <return>
```

Not only will that get you to the C-64 mode; it will also impress your friends. Figure out what decimal value C000 is and SYS it from Basic to activate this short program in C-64 mode.

In conclusion, the built-in monitor in your C-128 gives you far more flexibility and power than was available in the C-64. Not only is it possible to write assembly language programs for the C-128 mode, but you can write for the C-64 as well. As more and more people begin using the power of their monitor and mini-assemblers, we'll begin to see faster and more robust programs.

Address all author correspondence to William B. Sanders, 8982 Stimson Court, San Diego, CA 92129.

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Circle 43 on Reader Service card.

A Holiday Greeting

Why rely on Hallmark? This program lets you use your C-64 to design and print out your own personalized Christmas cards.

By SCOTT CALAMAR

Once again, the holiday season is upon us, providing an annual opportunity to catch up on correspondence and renew ties with old friends.

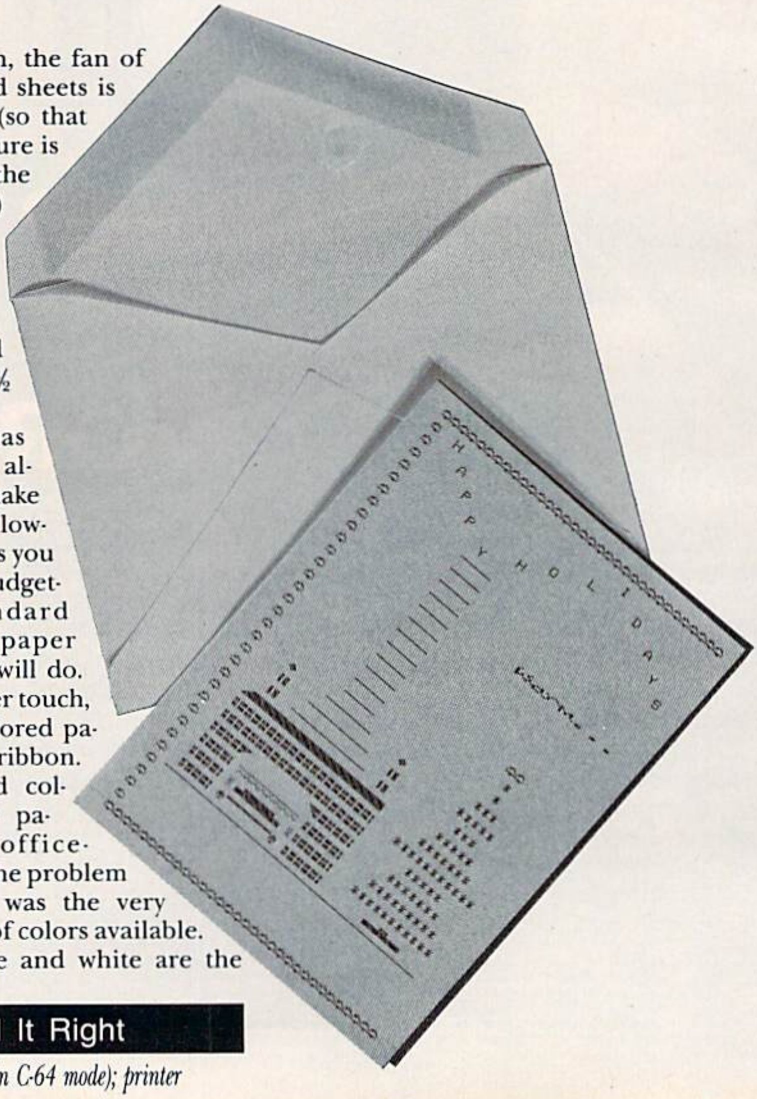
The Christmas Card program uses custom characters to print greeting cards that will stand out from others on the mantle this holiday season. Last year, they sparked much more response from friends and family than store-bought cards. They provided a topic of conversation that continued long after the holidays had ended.

To prevent the usual yule-season writer's cramp, this program includes an option to personalize each card for each recipient. All you have to do is type in the name. Or, if you prefer, you can print by quantity instead. The program can accommodate 100 personalized cards with each printing; but, should you be more popular than that, simply change the Dimension statement in line 2 to the quantity you need.

Printing is a two-step process that (after folding) produces cards that open. To print the pictorial covers and interior text pages, paper is fed into the printer twice. First, the cover is printed on the lower right side of each page. Then, the fan of attached printed sheets is turned around (so that the printed picture is upside down in the top-left corner) and fed into the printer again. The dimensions of the folded, finished card are 4¼ by 5½ inches.

The Christmas Card program allows you to make your cards as low-cost or elegant as you like. For the budget-minded, standard white printer paper and black type will do. If you seek a finer touch, you can buy colored paper or a colored ribbon.

You can find colored computer paper at many office-supply stores. The problem I encountered was the very limited variety of colors available. Shades of beige and white are the



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most common; bold colors seem to be the most difficult to find. I settled for a warm shade of light blue. Colored paper is about four times as expensive as white fanfold, but the package of colored paper will last long after the holiday season is over. (Razor Edge Products manufactures 20-lb. continuous letterhead paper, as well as matching envelopes, in some colors.) If you plan to address the envelopes by hand, or print address labels, you can match the colored paper to reasonably priced envelopes sold at stationery stores.

Broderbund Software sells the most festive variety of colored computer paper. This company manufactures a home printing program (The Print Shop) for the Commodore 64. A package of this replacement paper is perfect, as it includes matching envelopes. But it's also quite expensive.

Colored ribbons are much more difficult to find. In fact, I couldn't find any for the 1525 printer, despite the fact that one or two manufacturers do advertise colored ribbons for all printers.

Getting Started

The Christmas Card program leads you along each step of the way and provides time to set up your printer and paper.

First, type in the program, paying close attention to the correct symbols and numbers of spaces in the Print#4 statements. Be extra careful not to transpose numbers in the Data statements. Custom characters are used to create a border of holiday bells, the fire in the fireplace and the script print for the message. To simplify typing, you may omit the REM statements in the Data lines. They are provided in case you wish to use the script typeface in other programs.

Save the program to disk or tape before you run it, even though there are no New statements to wipe it from memory. The program is set up for tractor-feed or roll paper (continuous form paper). You can adapt it to printers that operate on a sheet-by-sheet basis by adding a pause subroutine after each sheet is printed. Simply insert WAIT 653,1 before the NEXTNO in lines 100 and 1100. The program will pause after each card to give you time to load the next sheet of paper. Press the shift-lock key to print the next page.

As the program instructs, load the paper as you would for a word processor. The top-of-the-page perforation should line up with the top of the print head in the printer. The program is set for standard 8½ × 11-inch paper.

After you've loaded the paper and turned on the printer, the program will ask for your name. Type it in as you would like it to appear on the card. Each card will bear this "signature"; but if you'd rather sign them by hand, simply press the return key at this prompt. This will leave a blank space instead of printing a signature.

For my own purposes, I allowed the card to be inscribed and then I handwrote any message I wanted to include. Dedicated computerists may want to generate Christmas form letters with a word processor to inform more distant acquaintances of the year's activities.

Next, the program asks whether cards are to bear the names of recipients. If so, type in each one in the same way that you entered the signature. Press the return key after each family or household. I decided to include an error trapper at this point to catch spelling mistakes. The additional keystroke slows the process slightly, but it could cut down on wasted cards.

To end the list of names, press the return key. The computer will determine the number of cards you've planned and will print covers and interiors accordingly. If you choose not to enter the salutation, you will be asked for the number of cards you wish to print.

Your name and, if you choose, the names of friends and relatives, will be printed in standard Roman upper- and lowercase characters, so be sure to use capital letters where you want them. Your signature is limited to about 70 characters, so if you have a large family, you may want to sign "John, Mary and the children," rather than list all the names individually.

Also note that commas are handled in a special way. To place them between names, either in the signature or the salutation, enclose the line in quotes. Examples are given in the program.

Printing Your Cards

After you've provided the above information, the printing begins. First, the covers are run, and then the program illustrates how to turn the paper. The cover designs are printed at the bottom-right corner of each sheet of paper.

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Circle 9 on Reader Service card.

It is important, especially with the 1525 printer, to leave a blank piece of paper before you tear off the fan of completed covers and reinsert the paper for the second step. This last piece will serve as a lead sheet when printing the card interiors. The 1525 will not print at the top of the first piece of paper and invariably wastes a sheet.

Tear off the last sheet at the bottom perforation. Turn the entire fan of paper around so that the designs still face away from the ground but are now upside down in the top left-hand corner of the paper. (Turn the paper around but not over—both designs are printed on the same side of the full sheet.) This is illustrated as the program runs. Line up the second piece of paper for printing (the first piece is the blank one you left at the end) and then hit the f1 key. The personalized interiors will be printed.

When this two-step process is completed, fold the cards in half horizontally between the printed sides, so that both sides face out. Then fold them in half vertically. This time, the picture should face out and the printing will be inside.

Making these Christmas cards is actually a simple process. Everything you need to know is included in the program.

The Christmas Card program is a fun and unique way to spread holiday cheer. To save even more time, use a "phone book" database program to print out computerized labels, instead of addressing all the envelopes by hand. Just think—the time you save can be spent in line at your favorite store waiting to pay for this year's equivalent of the Cabbage Patch dolls.

If you'd rather not type in the program, send me a blank disk or cassette, self-addressed stamped envelope and $3. Santa's elves will send you a copy.

Well, Merry Christmas to all, and to all a good byte. Ⓡ

Address all author correspondence to Scott Calamar, 917 San Anselmo Ave.#5, San Anselmo, CA 94960.

Listing 1. *Christmas Card program.*

```
1 REM XMAS CARD BY SCOTT CALAMAR      :REM*59
2 CLR:RESTORE:DIMQ$(100):TV=53281:SB=53280:
  PRINTCHR$(14)                      :REM*156
3 POKETV,2:POKESB,5:PRINT"{SHFT CLR}":FORSF
  =1TO10:PRINT"{CTRL 2}****";:NEXTSF
                                     :REM*247
4 GOSUB400:GOSUB1400:GOSUB1300:GOSUB1200
                                     :REM*180
5 POKETV,2:POKESB,5:PRINT"{SHFT CLR}{2 CRSR
   DNs}{CTRL 8}{SHFT P}RESS {SHFT F}1 {SHFT
   K}{SHFT E}{SHFT Y} TO {SHFT P}{SHFT R}{S
  HFT I}{SHFT N}{SHFT T}"             :REM*17
6 GETP$:IFP$<>"{FUNCT 1}"THEN6       :REM*168
7 PRINT"{CRSR DN}{CTRL 1}{SHFT P}RINTING CO
  VERS{2 CRSR DNs}{CTRL 3}"          :REM*105
8 FORNO=1TOHW:PRINT"{CRSR UP}{SHFT O}NLY {C
  TRL 2}"HW-NO+1"{COMD 6} MORE CARD(S) TO G
  O!!":IFHW<1THEN110                 :REM*230
9 OPEN4,4:FORD=1TO16:PRINT#4,CHR$(10):NEXTD
                                     :REM*129
10 PRINT#4,TAB(40);:FORW=1TO32:PRINT#4,CHR$
   (8)BE$;LL$;:NEXTW:GOSUB213:GOSUB301
                                      :REM*98
11 FORCH=1TO3:GOSUB212:PRINT#4,SPC(10)"{4 S
   HFT *s}":NEXTCH                    :REM*73
12 GOSUB212:PRINT#4,SPC(10)"{4 SHFT *s}"CHR
   $(14);                            :REM*170
14 PRINT#4,SPC(4)CHR$(8)W$;A$;R$;M$;:PRINT#
   4,CHR$(14)"..."CHR$(15)           :REM*138
15 FORCH=1TO4:GOSUB212:PRINT#4,SPC(10)"{4 S
   HFT *s}":NEXTCH                    :REM*77
16 GOSUB212:PRINT#4,SPC(10)"{4 SHFT *s}"SPC
   (14)CHR$(8)BE$;LL$;BE$;LL$CHR$(15)
                                      :REM*12
18 GOSUB212:PRINT#4,SPC(10)CHR$(15)"{4 SHFT
    *s}"SPC(15)"*"                    :REM*68
20 GOSUB212:PRINT#4,SPC(10)"{4 SHFT *s}"SPC
   (15)"*"                           :REM*154
22 GOSUB212:PRINT#4,SPC(10)"{4 SHFT *s}"SPC
   (14)"***"                         :REM*240
24 GOSUB212:PRINT#4,SPC(4)"{SHFT Z}"SPC(4)"
   {6 SHFT *s}{4 SPACEs}{SHFT Z}{7 SPACEs}*
   ****"                              :REM*66
26 GOSUB212:PRINT#4,SPC(4)"{CTRL 9}{SHFT B}
   {CTRL 0}"SPC(3)"{8 SHFT *s}"SPC(3)"{CTRL
    9}{SHFT B}{CTRL 0}"SPC(8)"***"    :REM*34
28 GOSUB212:PRINT#4,SPC(4)"{CTRL 9}{SHFT B}
   {CTRL 0}"SPC(2)"{10 SHFT *s}"SPC(2)"{CTR
   L 9}{SHFT B}{CTRL 0}"SPC(7)"*****"
                                     :REM*136
30 GOSUB212:PRINT#4,SPC(2)"{CTRL 9}{SHFT LB
   .}{18 SPACEs}{CTRL 0}"SPC(5)"*******"
                                      :REM*36
32 GOSUB212:PRINT#4,SPC(2)"{CTRL 9}{19 SHFT
    +s}{CTRL 0}"SPC(3)"***********":REM*112
34 GOSUB212:PRINT#4,SPC(2)"{CTRL 9}{19 SHFT
    +s}{CTRL 0}"SPC(6)"*****"        :REM*248
36 GOSUB212:PRINT#4,SPC(2)"{CTRL 9}{4 SHFT
   +s}{CTRL 0}{SHFT LB.}{8 SPACEs}{COMD *}{
   CTRL 9}{5 SHFT +s}{CTRL 0}"SPC(5)"******
   *"                                :REM*178
38 GOSUB212:PRINT#4,SPC(2)"{CTRL 9}{4 SHFT
   +s}{CTRL 0} ";:FORW=1TO8:PRINT#4,CHR$(8)
   FI$;:NEXTW                        :REM*118
39 PRINT#4,CHR$(15)" {CTRL 9}{5 SHFT +s}{CT
   RL 0}"SPC(4)"*********"           :REM*197
40 GOSUB212:PRINT#4,SPC(2)"{CTRL 9}{4 SHFT
   +s}{CTRL 0} {COMD -}{COMD I}{CTRL 9}{4 S
   PACEs}{CTRL 0}{COMD I} {COMD -}{CTRL 9}{
   5 SHFT +s}{CTRL 0}"SPC(3)"***********"
                                      :REM*48
42 GOSUB212:PRINT#4,SPC(2)"{CTRL 9}{4 SHFT
   +s}{CTRL 0} {SHFT A}{6 COMD Us}{SHFT A}
   {CTRL 9}{5 SHFT +s}{CTRL 0}"SPC(6)"{2 CO
   MD Is}{CTRL 9} {CTRL 0}{2 COMD Is}"
                                      :REM*12
44 GOSUB212:PRINT#4," {34 COMD Ys}" :REM*56
48 FORL=1TO3:GOSUB213:NEXTL          :REM*152
49 PRINT#4,TAB(40);:FORW=1TO32:PRINT#4,CHR$
   (8)BE$;LL$;:NEXTW                  :REM*81
50 PRINT#4,CHR$(15)CHR$(10)          :REM*224
100 CLOSE4:NEXTNO                    :REM*184
110 PRINT"{SHFT CLR}{CTRL 2}{5 CRSR DNs}{SH
    FT T}HE COVER IS FINISHED!"      :REM*170
120 PRINT"{CRSR DN}{SHFT N}OW, TEAR OFF THE
     PRINTED":PRINT"PAPER LEAVING ONE BLANK
     SHEET"                          :REM*152
122 PRINT"AFTER THE LAST CARD..."    :REM*232
125 PRINT"{2 CRSR DNs}{SHFT H}IT {SHFT R}{S
    HFT E}{SHFT T}{SHFT U}{SHFT R}{SHFT N}
    WHEN READY":INPUTPV$              :REM*99
127 PRINT"{SHFT CLR}{CRSR DN}{SHFT G}OOD. {
    SHFT N}OW TURN THE CONNECTED SHEETS":PR
    INT"SO THAT THE DESIGN"          :REM*163
128 PRINT"YOU JUST PRINTED IS FACING OUT, B
    UT":PRINT"IS NOW IN THE"         :REM*206
```

→

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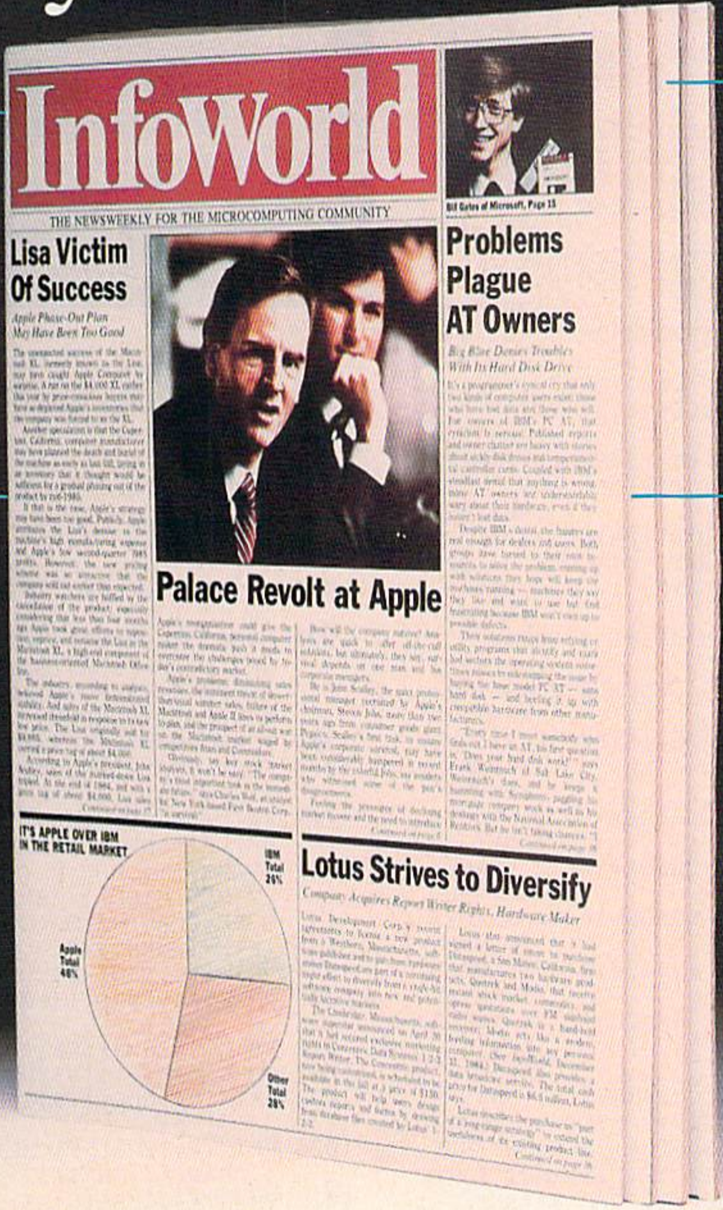
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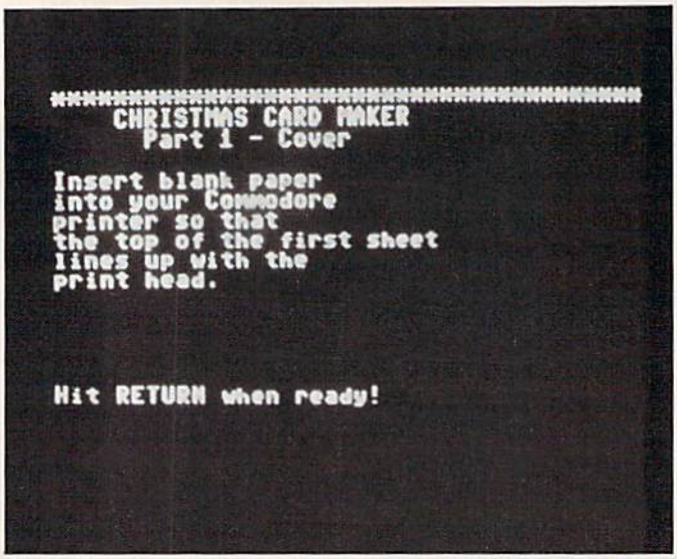
Listing 1 continued.

```
130 PRINT"UPPER LEFT-HAND CORNER OF THE PAP
    ER..."                            :REM*236
131 PRINTSPC(12)"{CRSR DN}{UP ARROW}{2 SPAC
    Es}{UP ARROW}{2 SPACEs}{UP ARROW}"
                                      :REM*105
132 PRINT"{7 COMD @s}{5 SPACEs}{8 COMD @s}"
                                       :REM*24
134 PRINT"{COMD G}{5 SPACEs}{COMD M}{5 SPAC
    Es}{3 COMD +s}{4 SPACEs}{COMD M}"
                                       :REM*38
136 PRINT"{COMD G}{5 SPACEs}{COMD M}{5 SPAC
    Es}{3 COMD +s}{4 SPACEs}{COMD M}"
                                       :REM*40
138 PRINT"{COMD G}{5 SPACEs}{COMD M}{5 SPAC
    Es}{COMD G}{6 SPACEs}{COMD M}"    :REM*2
140 PRINT"{COMD G}{3 SPACEs}{3 COMD +s}{5 S
    PACEs}{COMD G}{6 SPACEs}{COMD M}"
                                      :REM*148
142 PRINT"{COMD G}{3 SPACEs}{3 COMD +s}{5 S
    PACEs}{COMD G}{6 SPACEs}{COMD M}"
                                      :REM*150
144 PRINT"{7 COMD Ts}{5 SPACEs}{8 COMD Ts}"
                                       :REM*44
145 PRINT"{SHFT A}S{11 SPACEs}{SHFT I}NSERT
    ":PRINT"PRINTED{6 SPACEs}LIKE THIS"
                                      :REM*249
148 PRINT"{2 CRSR DNs}{SHFT L}INE TOP OF PA
    PER WITH FIRST":PRINT"UPSIDE-DOWN DESIG
    N"                                :REM*156
149 PRINT"WITH PRINTER HEAD":PRINT"{SHFT H}
    IT {SHFT R}{SHFT E}{SHFT T}{SHFT U}{SHF
    T R}{SHFT N} WHEN READY"           :REM*27
150 INPUTPV$:GOTO1000                  :REM*62
212 PRINT#4,TAB(40)CHR$(8)BE$;LL$;CHR$(15);
    :RETURN                            :REM*50
213 PRINT#4,TAB(40)CHR$(8)BE$;LL$;CHR$(15):
    RETURN                            :REM*233
214 PRINT#4,CHR$(16)"79"CHR$(8)BE$;LL$;CHR$
    (15):RETURN                        :REM*44
215 RETURN                             :REM*17
301 GOSUB212:PRINT#4,"{2 SPACEs}H{22 SPACEs
    }I                                :REM*218
302 GOSUB212:PRINT#4,"{4 SPACEs}A{17 SPACEs
    }L{5 SPACEs}D                      :REM*89
304 GOSUB212:PRINT#4,"{6 SPACEs}P{11 SPACEs
    }O{12 SPACEs}A"                    :REM*31
305 GOSUB212:PRINT#4,"{8 SPACEs}P{6 SPACEs}
    H{17 SPACEs}Y"                     :REM*64
306 GOSUB212:PRINT#4,"{11 SPACEs}Y{23 SPACE
    s}S"                              :REM*127
310 RETURN                            :REM*113
400 PRINT"{5 SPACEs}{SHFT C}{SHFT H}{SHFT R
    }{SHFT I}{SHFT S}{SHFT T}{SHFT M}{SHFT
    A}{SHFT S} {SHFT C}{SHFT A}{SHFT R}{SHF
    T D} {SHFT M}{SHFT A}{SHFT K}{SHFT E}{S
    HFT R}":PRINT"{5 SPACEs}{CTRL 8}{SHFT P
    }ART 1 - {SHFT C}OVER"            :REM*239
402 PRINT"{CRSR DN}{CTRL 2}{SHFT I}NSERT BL
    ANK PAPER":PRINT"INTO YOUR {SHFT C}OMMO
    DORE"                              :REM*47
403 PRINT"PRINTER SO THAT"            :REM*128
404 PRINT"THE TOP OF THE FIRST SHEET":PRINT
    "LINES UP WITH THE"                :REM*31
405 PRINT"PRINT HEAD.":PRINT"{CTRL 1}{2 CRS
    R DNs}{SHFT R}EMEMBER TO {SHFT T}{SHFT
    U}{SHFT R}{SHFT N} {SHFT O}{SHFT N} {SH
    FT P}{SHFT R}{SHFT I}{SHFT N}{SHFT T}{S
    HFT E}{SHFT R}!"                  :REM*130
410 PRINT"{2 CRSR DNs}{COMD 6}{SHFT H}IT {C
    TRL 9}{CTRL 8}{SHFT R}{SHFT E}{SHFT T}{
    SHFT U}{SHFT R}{SHFT N}{CTRL 0}{COMD 6}
     WHEN READY!":INPUTPV$:RETURN      :REM*69
1000 POKESB,2:POKETV,5:PRINT"{SHFT CLR}":FO
     RT=1TO10:PRINT"{CTRL 2}****";:NEXTT
                                      :REM*223
```



```
****************************************
     CHRISTMAS CARD MAKER
     Part 1 - Cover

Insert blank paper
into your Commodore
printer so that
the top of the first sheet
lines up with the
print head.



Hit RETURN when ready!
```

```
1001 PRINT"{CRSR DN}{CTRL 2}{SHFT X}{SHFT M
     }{SHFT A}{SHFT S} {SHFT C}{SHFT A}{SHF
     T R}{SHFT D} -- {SHFT I}NTERIOR--"
                                      :REM*228
1002 PRINT"{2 CRSR DNs}{SHFT H}IT {CTRL 1}{
     SHFT F}1 {SHFT K}{SHFT E}{SHFT Y}{CTRL
      2} WHEN READY TO PRINT INTERIORS"
                                      :REM*155
1003 GETF1$:IFF1$<>"{FUNCT 1}"THEN1003
                                      :REM*188
1006 OPEN4,4:PRINT"{SHFT CLR}{2 CRSR DNs}{S
     HFT P}{SHFT R}{SHFT I}{SHFT N}{SHFT T}
     {SHFT I}{SHFT N}{SHFT G}{2 CRSR DNs}":
     POKESB,2:POKETV,5                :REM*111
1007 FORNO=1TOHW:IFHW<1THEN1110       :REM*218
1008 FORD=1TO19:PRINT#4,CHR$(10):NEXTD
                                      :REM*255
1009 PRINT"{SHFT CLR}{2 CRSR DNs}{CTRL 2}{S
     HFT P}{SHFT R}{SHFT I}{SHFT N}{SHFT T}
     {SHFT I}{SHFT N}{SHFT G}{2 CRSR DNs}":
     PRINT"{CTRL 1}{SHFT O}NLY "(HW-NO)+1"
     MORE CARD(S) TO GO!!"             :REM*28
1010 IFTZ=1THEN1350                   :REM*207
1011 PRINT#4,TAB(45)CHR$(13)           :REM*22
1013 PRINT#4,CHR$(13)CHR$(13)CHR$(13)
                                      :REM*136
1015 PRINT#4,CHR$(15)TAB(52)"...";:PRINT#4,
     CHR$(8)W$;I$;S$;H$;E$;S$"        :REM*132
1016 PRINT#4,CHR$(15)CHR$(13)CHR$(13)
                                      :REM*141
1020 PRINT#4,TAB(55)CHR$(8)F$;O$;R$;:PRINT#
     4,CHR$(15)CHR$(32);                :REM*3
1022 PRINT#4,CHR$(8)A$:PRINT#4,CHR$(15)CHR$
     (13)CHR$(13)                      :REM*65
1024 PRINT#4,TAB(52)CHR$(8)GC$;L$;O$;WS$;I$
     ;N$;G$                           :REM*202
1025 PRINT#4,CHR$(15)CHR$(13)CHR$(13)
                                      :REM*151
1026 PRINT#4,TAB(48)CHR$(8)HC$;O$;L$;I$;D$;
     A$;Y$;:PRINT#4,CHR$(15)CHR$(32);
                                      :REM*100
1028 PRINT#4,CHR$(8)SC$;E$;A$;S$;O$;N$
                                      :REM*248
1030 PRINT#4,CHR$(15)CHR$(13)CHR$(13)CHR$(1
     3)                                :REM*46
1032 PRINT#4,CHR$(17)TAB(MA)SIG$CHR$(145)
                                       :REM*14
1050 FORT=1TO3:PRINT#4,CHR$(10):NEXTT
                                      :REM*170
1100 NEXTNO                           :REM*192
1110 PRINT"{SHFT CLR}{CTRL 1}{5 CRSR DNs}{S
     HFT F}INISHED!":CLOSE4           :REM*140
```

→

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Listing 1 continued.

```
1112 PRINT"{SHFT CLR}{CTRL 1}{SHFT N}OW YOU
      MAY SEPARATE THE CARDS AND{6 SPACEs}F
     OLD EACH LIKE THIS:"                :REM*4
1114 PRINTSPC(8)"{16 COMD Ps}"          :REM*62
1116 FORL=1TO7:PRINTSPC(8)"{7 COMD +s}"SPC(
     8)"{COMD N}":NEXTL                :REM*232
1117 PRINTSPC(10)"{6 CRSR UPs}{CTRL 7}{3 UP
      ARROWs}"                         :REM*225
1118 PRINTSPC(8)"{SHFT U}PSIDE-":PRINTSPC(9
     )"DOWN":PRINTSPC(8)"{SHFT P}ICTURE{2 C
     RSR DNs}{CTRL 1}"                 :REM*148
1120 PRINTSPC(8)"{COMD H}{CTRL 2}----------
     ----{CTRL 1}{COMD N}"               :REM*4
1122 PRINTSPC(8)"{COMD H}{14 SPACEs}{COMD N
     }"                                 :REM*50
1124 FORL=1TO6:PRINTSPC(8)"{COMD H}{7 SPACE
     s}{7 COMD +s}{COMD N}":NEXTL  :REM*112
1126 PRINTSPC(8)"{16 COMD Ys}"          :REM*74
1128 PRINT"{5 CRSR UPs}"SPC(16)"{CTRL 7}...
     {SHFT W}ARM":PRINTSPC(17)"{SHFT W}ISHE
     S":PRINTSPC(16)"{SHFT M}ESSAGE"
                                       :REM*174
1130 PRINT"{8 CRSR UPs}"SPC(33)"{CTRL 2}{CT
     RL 9}1":PRINTSPC(24)"{LEFT ARROW}{SHFT
      F}OLD HERE {SHFT F}{SHFT I}{SHFT R}{S
     HFT S}{SHFT T}"                   :REM*254
1132 PRINT"{7 CRSR DNs}{2 SPACEs}{CTRL 9}1{
     CTRL 0}{2 SPACEs}- {SHFT H}OLD SHEET L
     IKE THIS AND FOLD"                :REM*170
1134 PRINT"{7 SPACEs}THE TOP HALF DOWN {SHF
     T A}{SHFT W}{SHFT A}{SHFT Y} FROM YOU"
                                        :REM*54
1136 PRINT"{CRSR DN}{CTRL 8}{SHFT H}IT {SHF
     T R}{SHFT E}{SHFT T}{SHFT U}{SHFT R}{S
     HFT N} WHEN READY":INPUTPV$    :REM*12
1140 PRINT"{SHFT CLR}{CRSR DN}{CTRL 1}{SHFT
      C}ARD SHOULD LOOK LIKE THIS TO YOU NO
     W:"                               :REM*160
1141 PRINT"{SHFT C}OVER IS ON THE LEFT FACI
     NG":PRINT"AWAY FROM YOU"      :REM*199
1142 PRINTSPC(8)"{CRSR DN}{16 COMD Ps}"
                                       :REM*242
1144 PRINTSPC(8)"{COMD H}{6 SPACEs}{CTRL 2}
     {SHFT -}{CTRL 1}{7 SPACEs}{COMD N}"
                                        :REM*26
1146 FORL=1TO6:PRINTSPC(8)"{COMD H}{6 SPACE
     s}{CTRL 2}{SHFT -}{CTRL 1}{7 COMD +s}{
     COMD N}":NEXTL                    :REM*164
1148 PRINTSPC(8)"{16 COMD Ys}"          :REM*96
1150 PRINT"{5 CRSR UPs}"SPC(16)"{CTRL 7}...
     {SHFT W}ARM":PRINTSPC(17)"{SHFT W}ISHE
     S":PRINTSPC(16)"{SHFT M}ESSAGE"
                                       :REM*196
1152 PRINT"{2 CRSR DNs}"SPC(15)"{CTRL 2}{UP
      ARROW}":PRINTSPC(8)">>>>{3 SPACEs}{CT
     RL 9}2{CTRL 0}"                   :REM*234
1153 PRINTSPC(15)"{CRSR DN}{SHFT N}OW FOLD
     IN HALF HERE"                     :REM*105
1154 PRINTSPC(15)"PULLING COVER TOWARD YOU"
     :PRINTSPC(15)"SO MESSAGE PAGE IS"
                                        :REM*70
1156 PRINTSPC(15)"INSIDE AND YOU'RE LOOKING
     ":PRINTSPC(15)"{CRSR UP}AT THE COVER."
                                       :REM*186
1160 PRINT"{CRSR DN}{CTRL 7}{SHFT H}IT {SHF
     T R}{SHFT E}{SHFT T}{SHFT U}{SHFT R}{S
     HFT N} WHEN DONE.":INPUTPV$     :REM*24
1164 PRINT"{SHFT CLR}{2 CRSR DNs}{CTRL 1}{S
     HFT T}HAT WASN'T SO HARD, WAS IT?"
                                       :REM*126
1172 PRINT"{2 CRSR DNs}{CTRL 2}{SHFT H}IT {
     CTRL 9}{SHFT F}1{CTRL 0} KEY TO MAKE M
     ORE CARDS"                        :REM*166
1174 PRINT"{2 CRSR DNs}{CTRL 7}{SHFT A}NY O
     THER KEY WILL RESET COMPUTER BUT{3 SPA
     CEs}WON'T ERASE PROGRAM"          :REM*86
```

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Listing 1 continued.

```
1176 GETEN$:IFEN$=""THEN1176              :REM*112
1178 IFEN$="{FUNCT 1}"THENRUN             :REM*216
1180 PRINT"{CTRL 2}{4 CRSR DNs}{SHFT M}{SHF
     T E}{2 SHFT Rs}{SHFT Y}{SHFT SPACE}{SH
     FT C}{SHFT H}{SHFT R}{SHFT I}{SHFT S}{
     SHFT T}{SHFT M}{SHFT A}{SHFT S}, "SIG$
                                          :REM*208
1185 FORT=1TO2000:NEXT                    :REM*45
1190 POKE53280,14:POKETV,6:PRINT"{CTRL 2}{S
     HFT CLR}"CHR$(142):END               :REM*104
1200 PRINT"{2 CRSR DNs}{SHFT T}{SHFT H}{SHF
     T A}{SHFT N}{SHFT K}{SHFT SPACE}{SHFT
     Y}{SHFT O}{SHFT U}"                  :REM*176
1201 FORC=1TO6:READFI:FI$=FI$+CHR$(FI):NEXT
     C                                    :REM*13
1202 FORC=1TO6:READW:W$=W$+CHR$(W)+CHR$(W):
     NEXTC                                :REM*28
1204 FORC=1TO6:READA:A$=A$+CHR$(A)+CHR$(A):
     NEXTC                                :REM*202
1206 FORC=1TO6:READR:R$=R$+CHR$(R)+CHR$(R):
     NEXTC                                :REM*224
1207 FORC=1TO6:READM:M$=M$+CHR$(M)+CHR$(M):
     NEXTC                                :REM*155
1208 FORC=1TO6:READBE:BE$=BE$+CHR$(BE):NEXT
     C                                    :REM*70
1209 FORC=1TO6:READLL:LL$=LL$+CHR$(LL):NEXT
     C                                    :REM*229
1210 FORC=1TO6:READI:I$=I$+CHR$(I)+CHR$(I):
     NEXTC                                :REM*4
1212 FORC=1TO6:READS:S$=S$+CHR$(S)+CHR$(S):
     NEXTC                                :REM*140
1214 FORC=1TO6:READH:H$=H$+CHR$(H)+CHR$(H):
     NEXTC                                :REM*98
1216 FORC=1TO6:READE:E$=E$+CHR$(E)+CHR$(E):
     NEXTC                                :REM*112
1218 FORC=1TO6:READF:F$=F$+CHR$(F)+CHR$(F):
     NEXTC                                :REM*26
1220 FORC=1TO6:READO:O$=O$+CHR$(O)+CHR$(O):
     NEXTC                                :REM*246
1222 FORC=1TO6:READGC:GC$=GC$+CHR$(GC)+CHR$
     (GC):NEXTC                           :REM*204
1224 FORC=1TO6:READL:L$=L$+CHR$(L)+CHR$(L):
     NEXTC                                :REM*6
1226 FORC=1TO6:READWS:WS$=WS$+CHR$(WS)+CHR$
     (WS):NEXTC                           :REM*20
1228 FORC=1TO6:READN:N$=N$+CHR$(N)+CHR$(N):
     NEXTC                                :REM*88
1230 FORC=1TO6:READG:G$=G$+CHR$(G)+CHR$(G):
     NEXTC                                :REM*204
1232 FORC=1TO6:READHC:HC$=HC$+CHR$(HC)+CHR$
     (HC):NEXTC                           :REM*160
1234 FORC=1TO6:READD:D$=D$+CHR$(D)+CHR$(D):
     NEXTC                                :REM*220
1236 FORC=1TO6:READY:Y$=Y$+CHR$(Y)+CHR$(Y):
     NEXTC                                :REM*138
1238 FORC=1TO6:READSC:SC$=SC$+CHR$(SC)+CHR$
     (SC):NEXTC:RETURN                    :REM*232
1300 HW=0:PRINT"{SHFT CLR}{3 CRSR DNs}{SHFT
      D}O YOU WANT EACH CARD PERSONALIZED W
     ITH"                                 :REM*229
1301 PRINT"THE NAMES OF RECIPIENTS? (Y/N)?"
     :NN=0                                :REM*154
1302 GETZZ$:IFZZ$=""THEN1302              :REM*105
1304 IFZZ$<>"Y"THENIFZZ$<>"N"THEN1302
                                          :REM*243
1305 IFZZ$="N"THENPRINT"{2 CRSR DNs}{SHFT H
     }OW MANY CARDS?":INPUTPG$:HW=VAL(PG$):
     TZ=0:RETURN                          :REM*64
1310 POKETV,1:PRINT"{SHFT CLR}{CRSR DN}{CTR
     L 6}{SHFT O}KAY, TYPE IN THEIR FIRST N
     AMES":TZ=1:NN=0                      :REM*67
1311 PRINT"{SHFT T}HEN PRESS {SHFT R}{SHFT
     E}{SHFT T}{SHFT U}{SHFT R}{SHFT N}"
                                          :REM*66
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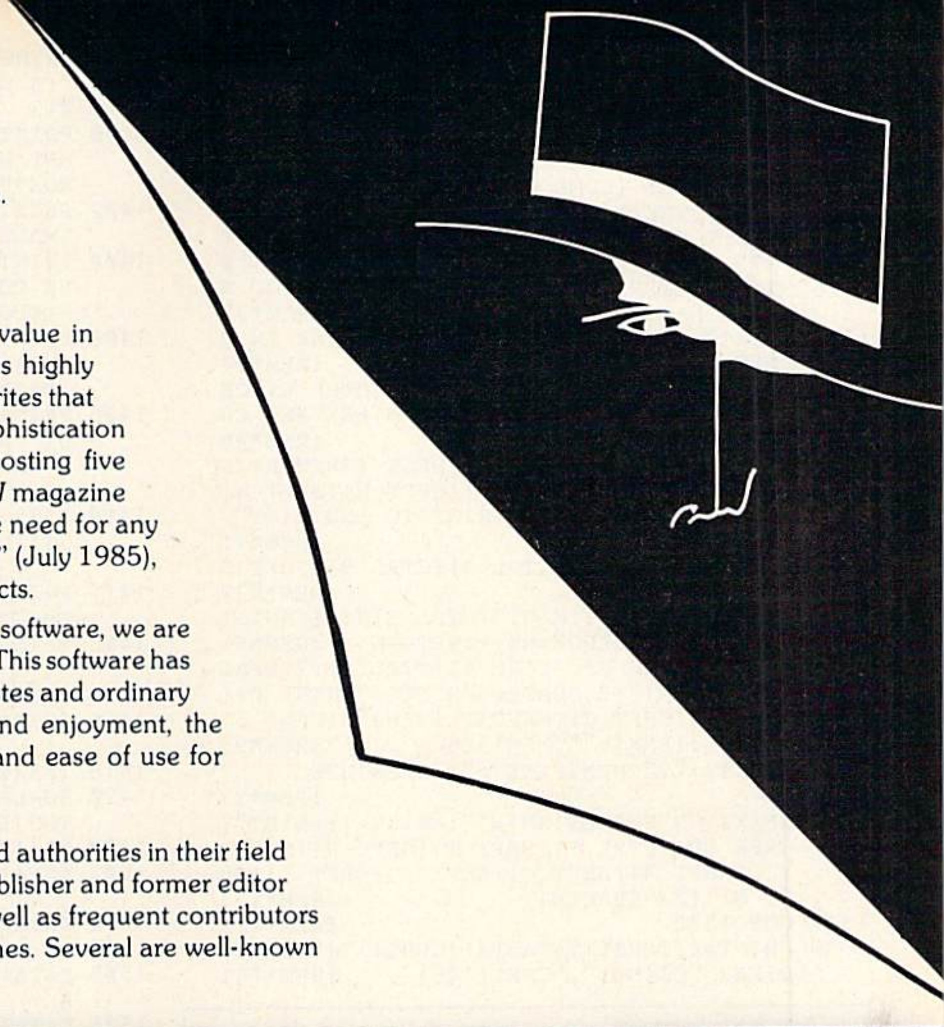

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Listing 1 continued.

```
1312 PRINT"{CTRL 7}{CRSR DN}{SHFT T}HE '{SH
     FT D}EAR' AND FINAL COMMA WILL{9 SPACE
     s}BE ON THE CARD."                :REM*147
1313 PRINT"{CTRL 5}{CRSR DN}{SHFT F}OR EXAM
     PLE, TYPE: {COMD 1}{SHFT B}OB & {SHFT
     M}ARY{CTRL 5} AND HIT{3 SPACEs}{SHFT R
     }{SHFT E}{SHFT T}{SHFT U}{SHFT R}{SHFT
      N}"                              :REM*110
1315 PRINT"{CRSR DN}{COMD 4}{SHFT I}F YOU N
     EED COMMAS BETWEEN NAMES ON A";:REM*32
1316 PRINT"{3 SPACEs}CARD PUT THE LINE IN Q
     UOTES"                             :REM*97
1317 PRINT"{SHFT E}XAMPLE, TYPE {CTRL 6}"CH
     R$(34)"{SHFT J}OHN, {SHFT M}ARY AND CH
     ILDREN"CHR$(34)                    :REM*48
1318 PRINT"{CRSR DN}{SHFT P}RESS {SHFT R}{S
     HFT E}{SHFT T}{SHFT U}{SHFT R}{SHFT N}
      AND NOTHING ELSE":PRINT"TO END LIST"
                                        :REM*91
1319 PRINT"{CRSR DN}{CTRL 3}{CTRL 9}{SHFT D
     }EAR{CTRL 0}"                     :REM*232
1320 NN=NN+1:Q$="":INPUT"{CTRL 3}";Q$(NN):I
     FQ$(NN)=""THENHW=NN-1:RETURN      :REM*61
1322 PRINT"{CRSR UP}{CTRL 5}{CTRL 9}{2 SPAC
     Es}"Q$(NN)"{2 SPACEs}"SPC(5)"{CTRL 0}{
     CTRL 7}{SHFT C}ORRECT? (Y/N)" :REM*161
1326 GETXX$:IFXX$=""THEN1326           :REM*95
1328 IFXX$<>"Y"THENIFXX$<>"N"THEN1326
                                        :REM*37
1330 IFXX$="N"THENQ$(NN)="":NN=NN-1:PRINT"{
     CRSR UP}{CTRL 1}{SHFT T}{SHFT R}{SHFT
     Y} {SHFT A}{SHFT G}{SHFT A}{SHFT I}{SH
     FT N}:{22 SPACEs}"               :REM*177
1340 GOTO1320                          :REM*119
1350 PRINT#4,CHR$(15)TAB(41)CHR$(17)"{SHFT
     D}EAR "Q$(NO)","CHR$(145)        :REM*161
1352 PRINT"{SHFT P}RINTING CARD FOR "Q$(NO)
     "{8 SPACEs}":PRINT"{2 CRSR UPs}":GOTO1
     013                                :REM*93
1400 PRINT"{SHFT CLR}{2 CRSR DNs}{CTRL 2}{S
     HFT H}OW WOULD YOU LIKE TO SIGN THE CA
     RDS?"                              :REM*61
1402 PRINT"{CRSR DN}{SHFT U}SE CAPITAL AND
     SMALL LETTERS"                     :REM*53
1404 PRINT"{CRSR DN}{SHFT I}F YOU NEED TO U
     SE COMMAS, ENCLOSE THE{2 SPACEs}LINE I
     N QUOTES"                          :REM*23
1406 PRINT"{2 CRSR DNs}{SHFT E}XAMPLE: {SHF
     T T}YPE IN {COMD 6}{SHFT J}OHN & {SHFT
      M}ARY {SHFT S}MITH"              :REM*141
1408 PRINT"{CRSR DN}{CTRL 2}{SHFT O}R{COMD
     6} "CHR$(34)"{SHFT J}OHN, {SHFT M}ARY
     & THE {SHFT S}MITH FAMILY"CHR$(34)
                                        :REM*65
1410 SIG$="":INPUT"{CTRL 1}{2 CRSR DNs}";SI
     G$:IFSIG$=""THEN1412{2 SPACEs}"
                                       :REM*195
1411 PRINT"{CRSR UP}{CTRL 9}{CTRL 8}{2 SPAC
     Es}"SIG$"{2 SPACEs}"               :REM*4
1412 PRINT"{COMD 8}{SHFT C}ORRECT? (Y/N)":
                                       :REM*145
1414 GETXX$:IFXX$=""THEN1414          :REM*173
1416 IFXX$<>"Y"THENIFXX$<>"N"THEN1414
                                       :REM*249
1418 IFXX$="N"THEN1410                :REM*119
1420 SG=LEN(SIG$):IFSG>70THENPRINT"{CTRL 9}
     TOO LONG!":GOTO1410                 :REM*7
1422 MA=(75-SG):RETURN                :REM*157
1502 DATA194,164,146,164,194,164:REMFIRE
                                        :REM*27
1504 DATA254,161,152,160,230,153:REM-W-
                                       :REM*209
1506 DATA160,240,200,200,188,192:REM SMALL
     A                                  :REM*53
1508 DATA196,184,132,130,132,136:REM SMALL
     R                                 :REM*173
1510 DATA252,136,176,136,188,192:REM SMALL
     M                                 :REM*201
1511 DATA0,48,168,166,166,227,226,166,168,4
     8,0,0:REM BELL                      :REM*0
1512 DATA192,160,154,250,192,192:REM SMALL
     I                                  :REM*87
1514 DATA192,200,212,212,164,132:REM SMALL
     S                                 :REM*123
1516 DATA132,255,136,136,248,192:REM SMALL
     H                                 :REM*167
1518 DATA192,252,228,212,204,160:REM SMALL
     E                                 :REM*229
1520 DATA 0,254,145,145,145,146:REM SMALL F
                                       :REM*143
1522 DATA144,184,196,196,188,144:REM SMALL
     O                                  :REM*37
1524 DATA132,190,193,209,241,246:REM CAP G
                                        :REM*47
1526 DATA192,160,254,201,199,160:REM SMALL
     L                                  :REM*73
1528 DATA184,196,176,192,184,196:REM SMALL
     W                                 :REM*225
1530 DATA136,248,132,132,248,192:REM SMALL
     N                                 :REM*189
1532 DATA 204,212,210,210,252,144:REM SMALL
      G                                :REM*171
1534 DATA193,255,136,136,255,193:REM CAP H
                                        :REM*75
1536 DATA184,196,196,200,254,193:REM SMALL
     D                                  :REM*42
1538 DATA144,204,208,208,188,0:REM SMALL Y
                                       :REM*150
1540 DATA166,201,201,201,201,177:REM CAP S
                                       :REM*220
```

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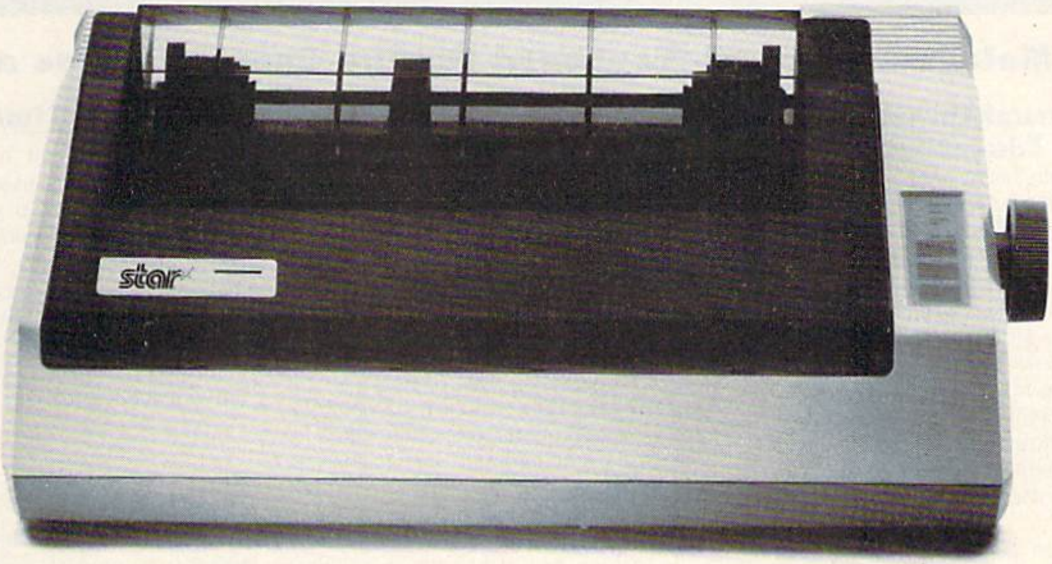

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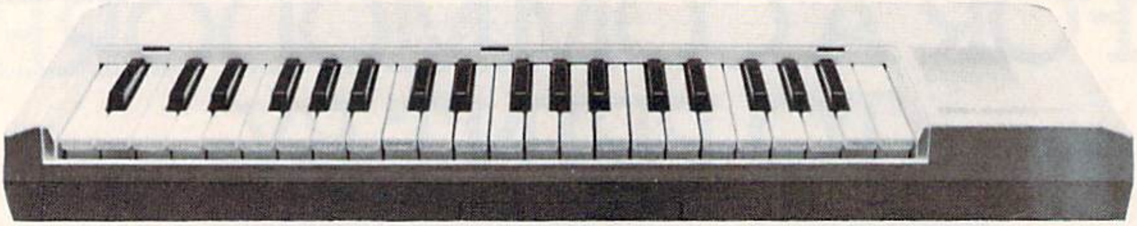

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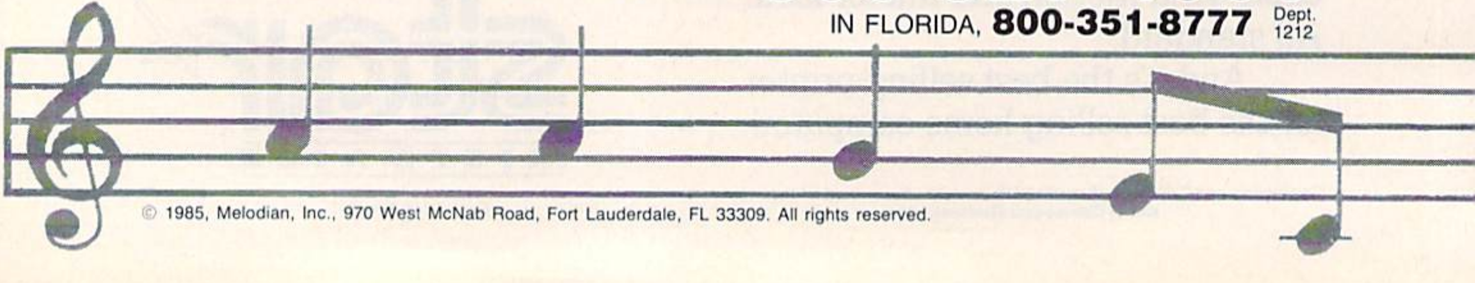

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Recording (with ConcertMaster)

Three track sequencer (recorder) with overdubbing and multitimbral (different instrument sounds at the same time) effects.

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ScoreMaster Requires:

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- Melodian ConcertMaster program.

RhythmMaster Software rm-01

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RhythmMaster teaches a beginner how to read music and play it correctly and in rhythm on the musical keyboard.

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- How to play in different tempos.

RhythmMaster Requires:

- Commodore 64 or Commodore 128 with disk drive.
- Melodian Musical Keyboard kb-01 is required to study the reading and playing of musical notes. However, RhythmMaster can be used without the Melodian Musical Keyboard to study rhythm, by playing the notes on the computer keyboard.

Programmer's Tool Kit

pt-01 $29.95

Contains programs, and BASIC source listings for reading the Melodian Musical Keyboard, and for reading and creating music files for Melodian ConcertMaster.

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ConcertMaster teaches how a composition is put together, note by note, instrument by instrument. You learn to play 35 pre-recorded songs from Bach to Rock. Then you can compose your own songs and record them right onto your floppy disk.

ConcertMaster Teaches:

- Scales
- Bass lines
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Instruments Sounds

Organ, Trumpet, Flute, Clarinet, Piano, Harpsicord, Violin, Cello, Bass, Banjo, Mandolin, Calliope, Concertina, Bagpipe, Synthesizer 1, Synthesizer 2, Clavier 1, Clavier 2, which can be played over a 7 octave range. Programmable sounds as well.

Recording Functions:

Three track sequencer (recorder) with overdubbing and multitimbral (different instrument sounds at the same time) effects.

Each track can be set to one of seven different functions:

- **Monitor:** Lets you use a track to play music live, without recording it.
- **Record:** Records a track as you play.
- **Playback:** Lets you hear whatever has been recorded or loaded into the track. You may playback one track while recording another to build layers of instruments.
- **Mute:** Turns a track off. This is useful when you want to listen to or record one or two tracks at a time.
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ConcertMaster Requires:

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C-64 Color Expansion

Finally, an adequate, easy-to-understand explanation of the C-64's Extended Background Color mode, which lets you create spectacular text displays.

By LOUIS F. SANDER

The C-64's Extended Background Color (EBC) mode is like the glyphs on Pharaoh's tomb: terribly intriguing, but incomprehensible to anyone but a high priest or a Ph.D. And that's a shame, since EBC mode is an easy-to-use feature that can add color, flash and finish to even the simplest program.

As with so many computer features, the difficulty lies not with the feature itself, but with the explanations its creators have written for it. I hope what we have on these pages is a Rosetta stone that can open the EBC mode for use by every C-64 programmer.

What EBC Mode Does

EBC mode allows expanded use of color in C-64 text displays. When working with EBC mode, the programmer has independent control of the print and background colors for every character on the screen. All 16 C-64 colors can be used in any combination, but only four different background colors can be active at one time. As a programmer, you can think of EBC mode as a super-enhanced reverse-field capability, and you can use it to create spectacular text presentations.

I've emphasized the word *text*, because enabling EBC mode *dis*ables all the graphics characters that appear on the front surfaces of your keys. It also disables the shifted versions of the characters A through Z, so you can use either upper- or lowercase letters, but not both together on the same screen. As in normal background mode, you select upper- or lowercase by pressing the shift and Commodore keys simultaneously, or by printing CHR$(14) or CHR$(142).

The print color of any character in EBC mode is determined as it is in normal background mode: When printing a character, its color depends on the currently effective print color; when Poking a character, its color depends on the contents of the appropriate location in color memory.

The *background* color of a character in EBC mode is determined in a somewhat unusual way—by the status of the shift key and the RVS On/Off mode when the character is printed. There are four background colors, numbered from 0–3, and here's how they're tied to the printed character:

Character	Bkgd Color#
RVS off, unshifted	0
RVS off, shifted	1
RVS on, unshifted	2
RVS on, shifted	3

In EBC mode, shift and RVS on/off control the background on which the character is printed, but they have no effect on the character itself. The character will appear unshifted and in its normal color, on a background color selected by the shift and/or RVS keys.

If you print an unshifted light blue A, it will appear as a light blue A on background color 0. (Whether it's upper- or lowercase, of course, will depend on the currently active character set.) If you print a *shifted* light blue A, it will show up as an *un*shifted light blue A on background color 1. If you print the same two characters with RVS enabled, they'll show up as unshifted light blue A's on background colors 2 and 3, respectively.

These rules also apply when you Poke the characters to the screen instead of printing them. Poking a reversed shifted "X," for example, will produce an unshifted X on background color 3. The X's color will depend on color memory; on many 64s, this means that the X's color will be the same as the screen color, unless something else has been put into color memory. But because of the different background color, you can *see* the X!

The background colors are determined by Poking locations 53281–53284 with color values selected from the list on p. 61 of your C-64's user's guide. You can Poke the following locations with any color you'd like, but these values are automatically put there when you turn on the power or when you press the stop/restore key combination.

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Bkgd Color#	Location	Poke	Color
0	53281	6	Blue
1	53282	1	White
2	53283	2	Red
3	53284	3	Cyan

You may notice that 53281 is the same location used in non-EBC mode to set the screen color. It has exactly the same function in EBC mode—it sets the screen color, which is also background color 0.

To get into and out of EBC mode, you make Pokes to location 53265. Bit 6 of that location turns EBC mode on (1) and off (0), while the remaining bits control other video functions. It is important to avoid disturbing those other bits, so the *Commodore 64 Programmer's Reference Guide* suggests this Poke to enable EBC mode:

```
POKE 53265, PEEK(53265) OR 64
```

Bit-dabblers among you will recognize this as a Poke to set bit 6, while leaving the others alone. The Poke to clear bit 6, which disables EBC mode, is:

```
POKE 53265, PEEK(53265) AND 191
```

This line will enable *or* disable EBC mode, whichever is appropriate:

```
POKE 53265, (PEEK (53265) AND NOT 64)
OR (64 AND NOT PEEK (53265))
```

There's a shorter way to control EBC mode, if you haven't set any other special video modes. I've worked with this method for quite a while without any problems. To enable EBC mode, just enter:

```
POKE 53265,91
```

To disable it, enter:

```
POKE 53265,27
```

If you should get into trouble with these, simultaneously hit the stop and restore keys and try again. By the way, the stop/restore combination disables EBC mode all by itself.

The accompanying demonstration program (Listing 1) lets you experiment with EBC mode. It prints a line of text using all four combinations of shift and RVS, then prints some Direct mode commands on the screen. By positioning your cursor on the appropriate Direct mode command and pressing the return key, you can see the effect of various Pokes on the printed line of text.

The first Poke enables EBC mode. The second disables it, then puts your cursor back on the first Poke line. By repeatedly pressing the return key, you can alternately switch in and out of EBC mode. By moving the cursor down to the other lines and changing the Poked values, you can alter the selected background colors. By changing the color-control character in line 110, then running the program again, you can experiment with other character colors.

When you first run the program, note that the cursor turns red as soon as EBC mode is enabled. This makes sense if you realize that the cursor is just a reverse-field space and that background color 2, corresponding to reverse-field characters, is red when you turn on the power. Poke a 0 into 53283 and watch the cursor change to black.

Details and Fine Points

If you've followed along this far, you have a good understanding of EBC mode, and you'll want to start using it in your own programs. Before you do, though, there are some rules you should know about the EBC mode character sets.

The 64-character limitation is easy to deal with if you consider where those characters are placed on the

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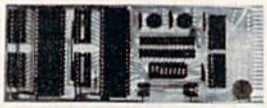

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keys. When using unshifted, unreversed characters (background color 0), you can use any character printed on the tops of your keys, plus the space bar.

If you'll look at your keyboard right now, you'll see *two* symbols on each number key, as well as on several keys in the bottom two rows. The upper symbols on these keys are important punctuation marks, and you *do* have access to them with background color 0. So, strictly speaking, "unshifted" and "text" aren't perfect names for the keys that produce characters on background 0. What you really get are all the letters and numbers, plus all the important punctuation marks, plus space. If you count them, you'll find there are 64 such characters, all printed on the top surfaces of the keys.

When using unshifted, *reversed* characters (background color 2), the same characters are also accessible. In this case, the space character appears as a solid block of background color 2.

Important things happen to your keyboard when using either of the background colors created by *shifted* characters (#1 and #3). In these cases, only the alphabet keys (A–Z) and the space and up-arrow characters are produced as normal by the keyboard. Neither the numbers nor the shifted punctuation marks will work. (They will show up on background color 0.)

The missing characters *can* be produced by using CTRL and various keys, but there's no simple relationship between the key and the character it produces. Because of this limitation in backgrounds 1 and 3, you should use backgrounds 0 and 2 for your most complex text, saving 1 and 3 for the simpler copy.

It's important to note that screen Pokes don't share this limitation; unlike keyboard characters, screen Pokes work identically with all four backgrounds.

Finally, you can use EBC mode with non-standard character sets. When you do, your character set will be limited to 64 characters, which is the same as the limitation for standard characters.

EBC Mode Highlights

In summary, here are the most striking features of Extended Background Color mode:

1. EBC mode exists so you can display individual text characters on as many as four different colored backgrounds.
2. EBC mode and its background colors are controlled by Pokes to five locations on the VIC chip.
3. Selection among the background colors is made by using the shift and RVS keys.
4. Enabling EBC mode disables all the graphics characters, so an EBC mode screen must be all text, which can be either printed or Poked to the screen.
5. Depending on the character set you select, the text will be upper- or lowercase.
6. EBC mode works with the first 64 characters from standard or custom-character sets.
7. On backgrounds 0 and 2, the keyboard can produce any character printed on the tops of your C-64 keys, plus a space. In practice, backgrounds 1 and 3 are limited to the letters and the space.

Well, that's all there is to Extended Background Color mode. I promised you could create spectacular text presentations, so let me show you what I had in mind.

If you'll type and run the Li'l Dazzler program, Listing 2, you'll get an idea of EBC mode's capabilities and perhaps get some inspiration, too. It shows every character color printed on every background color. I've made no attempt to optimize the color combinations, so much more attractive displays are possible. Creating them is left as a challenge for you.

Address all author correspondence to Louis F. Sander, 153 Mayer Drive, Pittsburgh, PA 15237.

Listing 1. *Demonstration program.*

```
10 REM ** EXTENDED BACKGROUND DEMO **
                                   :REM*196
20 REM                              :REM*82
30 REM{8 SPACEs}LOUIS F. SANDER     :REM*58
40 REM                             :REM*102
100 PRINT"{SHFT CLR}";              :REM*40
110 PRINT"{COMD 7}";:REM PRINT COLOR
                                   :REM*158
120 PRINT"ONE","{SHFT T}{SHFT W}{SHFT O}","
    {CTRL 9}THREE{CTRL 0}","{CTRL 9}{SHFT F
    }{SHFT O}{SHFT U}{SHFT R}{CTRL 0}{2 CRS
    R DNs}"                        :REM*112
130 PRINT"POKE 53265,91{2 CRSR DNs}"
                                   :REM*162
140 PRINT"POKE 53265,27 :PRINT{CTRL 9}"CHR$
    (34)"{7 SHFT Qs}"              :REM*104
150 PRINT"{CRSR DN}"               :REM*100
160 PRINT"POKE 53281,6{2 CRSR DNs}":REM*242
170 PRINT"POKE 53282,1{2 CRSR DNs}":REM*152
180 PRINT"POKE 53283,2{2 CRSR DNs}" :REM*68
190 PRINT"POKE 53284,3"             :REM*84
200 PRINT"{HOME}"                  :REM*182
```

Listing 2. *Li'l Dazzler program.*

```
10 REM ** LI'L DAZZLER **
20 REM
30 REM LOUIS F. SANDER
40 REM
100 PRINT" {SHFT CLR}{2 CRSR DNs}"
110 POKE53281,1
120 FORI=0TO15
130 :POKE 646,I
140 :PRINT "HUES {SHFT H}{SHFT U}{SHFT E}{S
    HFT S} {CTRL 9}HUES{CTRL 0} {CTRL 9}{SH
    FT H}{SHFT U}{SHFT E}{SHFT S}{CTRL 0} "
    ;
150 :J=J+1:IFJ=2 THEN J=0:PRINT
160 NEXTI
170 POKE53265,91
180 FORI=0TO15
190 :FORT=1TO600:NEXTT
200 :FORJ=0TO2
210 :POKE53282+J,I+J
220 : NEXTJ
230 NEXTI
240 POKE53265,27
250 PRINT"{COMD 7}"
```

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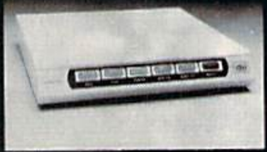

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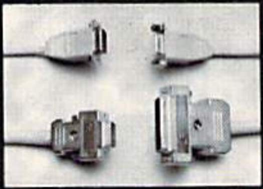

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128 Perfect Typist

By JAMES E. BORDEN

You have the C-64 checksum. Now here's one for the C-128, allowing you to enter your programs quickly and accurately.

128 Perfect Typist (Listing 1) is similar to the 64 Perfect Typist that was first published in *RUN*'s September issue. If you've used 64 Perfect Typist, you'll know how to use 128 Perfect Typist.

Be sure your C-128 is in 128 mode before typing in 128 Perfect Typist, After you've typed in the program, save it before running it. When you run it, you'll see the start-up screen. 128 Perfect Typist will always have the same SYS addresses: 5120 for on and 5150 for off. As with the 64 version, the only way to disable 128 Perfect Typist is with the SYS 5150 (off) command (or Reset, but that's a little drastic).

The 128 Perfect Typist will work on either a 40- or 80-column screen. Also, it lets you use the C-128's automatic line numbering. If Auto is on, the checksum will be printed below the line just entered, and the C-128 will print the next line number below the checksum. Although this allows fewer lines on the screen, they'll appear automatically.

For more detailed information on how to use *RUN*'s proofreader programs, see p.00 in this issue. R

Address all author correspondence to James E. Borden, 641 Adams Road, Carlisle, PA 17013.

Listing 1. *128 Perfect Typist program.*

```
1 REM 40/80 COL 128 MODE PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17013
7 REM
10 FORX=5120TO5379:READD:T=T+D:POKEX,D:NEXT
20 IFT<>28312 THENPRINT"{2 CRSR DNs}ERROR I
   N DATA...":END
25 A$="":IFPEEK(215)=128THENA$="{20 SPACEs}
   "
30 PRINT"{SHFT CLR}"A$"{CRSR RT}***********
   ***************************"
40 PRINTA$"{CRSR RT}** 128 PERFECT TYPIST I
   S NOW ACTIVE **"
50 PRINTA$"{CRSR RT}**{2 SPACEs}SYS 5120=ON
   {7 SPACEs}SYS 5150=OFF{2 SPACEs}**"
60 PRINTA$"{CRSR RT}***********************
   ****************":SYS5120:NEW
5120 DATA 173,005,003,201,020,208,001,096,1
     41,045
5130 DATA 020,173,004,003,141,044,020,162,0
     43,160
5140 DATA 020,142,004,003,140,005,003,096,2
     34,234
5150 DATA 173,044,020,141,004,003,173,045,0
     20,141
5160 DATA 005,003,096,032,013,067,140,255,0
     19,162
5170 DATA 000,142,252,019,142,253,019,142,2
     54,019
5180 DATA 189,000,002,201,032,240,008,201,0
     48,144
5190 DATA 007,201,058,176,003,232,208,238,1
     89,000
5200 DATA 002,240,054,201,032,208,005,172,2
     54,019
5210 DATA 240,042,201,034,208,010,072,173,2
     54,019
5220 DATA 073,001,141,254,019,104,072,238,2
     53,019
5230 DATA 173,253,019,041,007,168,104,024,0
     72,024
5240 DATA 104,016,001,056,042,136,016,246,1
     09,252
5250 DATA 019,141,252,019,232,208,197,173,2
     52,019
5260 DATA 024,101,022,024,101,023,141,252,0
     19,169
5270 DATA 042,032,241,020,032,188,020,160,0
     02,185
5280 DATA 185,020,032,241,020,136,016,247,1
     65,116
5290 DATA 208,009,165,117,208,005,169,145,0
     32,241
5300 DATA 020,172,255,019,096,013,032,032,1
     62,000
5310 DATA 173,252,019,232,056,233,100,176,2
     50,105
5320 DATA 100,202,240,003,032,232,020,201,0
     10,176
5330 DATA 005,205,252,019,240,015,162,000,2
     32,056
5340 DATA 233,010,016,250,024,105,010,202,0
     32,232
5350 DATA 020,170,072,138,009,048,032,241,0
     20,104
5360 DATA 096,170,173,000,255,072,169,000,1
     41,000
5370 DATA 255,138,032,210,255,104,141,000,2
     55,096
```

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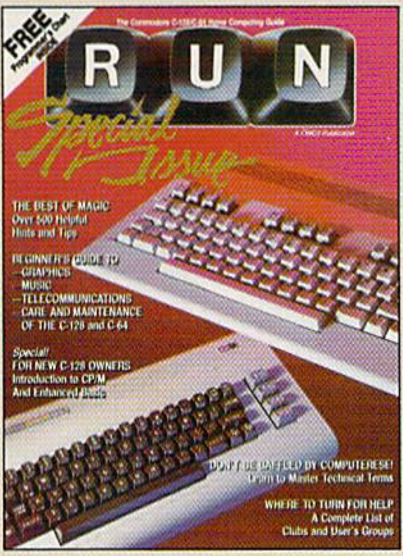
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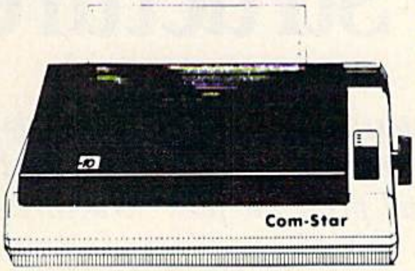

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Datafile Structure Utility

This latest addition to the Datafile series lets you examine sequential files from that series and print the files' structures.

By MIKE KONSHAK

The Datafile Structure utility, or DFStructure, allows you to peek at the sequential files created by Datafile or other programs. DFStructure reads the files generated by the following programs and produces a printout, on either screen or printer.

These programs are: Datafile (database program; *RUN*, November 1984); DFReport and DFMail (both sub-programs of Datafile; December 1984); and DFCalc (companion program to Datafile; in the recent ReRUN Productivity Pak). The last three programs produce format files for printing out records that Datafile creates.

Each program in the Datafile series writes sequential files to the disk using a unique code that precedes the filename. It is possible for all these programs to create files with the same name. The difference, which becomes apparent only when you view the disk directory, is in the special characters that precede the filenames.

The following codes, which precede the filename, SAMPLE, are written by the respective programs:

```
DATAFILE.....DF]   SAMPLE FILE
DFREPORT....RP]   SAMPLE FILE
DFMAIL .......ML]   SAMPLE FILE
DFCALC .......CR]   SAMPLE FILE
```

Every sequential file in the Commodore operating system is further identified on the directory with a SEQ after the filename.

Beginning DFStructure

To use DFStructure, first type LOAD"DFSTRUCTURE",8 and press the return key. Then type RUN <return>. You'll first see an introduction screen, followed by this menu:

```
[ DATAFILE OR FORMAT FILE SELECTION ]

  [D]ATAFILE RECORD FILES
  [R]EPORT FORMAT FILES
  [M]AILING LABEL FORMAT FILES
  [C]ALCULATED REPORT FORMAT FILES
  [N]ON-DATAFILE SEQUENTIAL FILES
  [$] DISK DIRECTORY
  [Q]UIT PROGRAM

[     PRESS THE APPROPRIATE KEY     ]
```

(Letters or words surrounded by brackets denote reversed printing on the screen and normally identify a prompted key to be pressed. Letters or a word surrounded by inequality signs denote an actual key to press.)

Pressing $ will display the directory of the disk currently in the drive. When you view the directory of files created by Datafile, you'll notice that the filenames are preceded by two characters and a right bracket (i.e., DF]...). These special codes allow the use of identical names for files, yet keep the names distinct for the disk operating system.

Pressing D, R, M, C or N will initiate a prompt for the name of your sequential file. If the file is one of the Datafile programs, just enter the name without the special characters. If not, you must type in the name exactly as shown on the disk directory.

After you enter the name and press the return key, the program will search out the data from the disk and display it. Different files use different routines, but they are all very simple to understand.

If, for example, you want to see the format of the datafile MAIL LIST, you press the D key to view the structure of the file. You'll be asked for the name of the file. If you had previously entered a filename, it would automatically be printed at this point. Do *not* use the special codes as they appear on the directory, but enter the name as shown below.

```
ENTER NAME OF SEQUENTIAL FILE:

     ? MAIL LIST        <Return>
```

If you enter a filename that is either not on the disk or not a Datafile file, then you will receive a File Not Found error message.

After you enter the filename, the disk drive will start running and the screen will display the following (assuming you are reading the format of the sample file MAIL LIST):

```
[  STRUCTURE OF DATAFILE MAIL LIST  ]

  # RECORDS POSSIBLE IN FILE   [ 192]
  # RECORDS IN CURRENT FILE    [ 4]
  # FIELDS IN EACH RECORD      [ 8]

  [#    TITLE OF FIELDS      LENGTH]
  [1]   LAST NAME ..............15
  [2]   FIRST NAME .............10
  [3]   CODE.....................5
  [4]   STREET .................32
  [5]   CITY....................23
```

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```
[6]  STATE ....................2
[7]  ZIP ......................5
[8]  PHONE ...................12

[S]CAN RECORDS
[P]RINT STRUCTURE
[E]XIT
```

You'll notice that the red light on the disk drive is still on at this time. The file is actually still open, waiting for your next decision.

Pressing E will exit you back to the main menu, closing the file in the process. The red light should then go out.

Pressing P will produce a hard copy of the file structure by sending the data to the printer. The printout will be similar to that shown on the screen. When the printer has finished its operation, you'll be returned to the above screen.

Pressing S will allow you to view in turn the datafile records in the current file structure. Before DFStructure begins this operation, it shows the following:

```
PRESS [CTRL] SLOW [F7] START/STOP
           [F1] EXIT
```

Pressing any key will then start reading and displaying the records in the datafile. The record number will be displayed before each record, followed by the field number and the data within each field.

Pressing <CTRL> will slow down the scanning operation so that you may view the data more easily.

Pressing the f7 key will stop the operation after a record has been printed on the screen, and pressing f7 will again start the scan.

Pressing the f1 key will let you exit the scan and bring you back to the structure screen.

Datafile Record File Structures

Each of the various files created by the Datafile series will have different information contained within a structure display. As shown above, Datafile record files contain the following information:

- Number of records possible in file.
- Number of records in the current file.
- Number of fields within each record.
- Title of each field.
- Length of each field.
- Data contained in each record in fields.
- Index number for sorting records.

You may view the actual string and numerical data, as they appear on the disk, by selecting the Non-Data-

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file Sequential File option at the main menu. This will show you the exact sequence of the contents of the datafile as it resides on the disk. The data will be displayed serially, without any format or labels.

If you use this option, the filename must be entered exactly as it appears on the disk directory (i.e., MAIL LIST is actually DF] MAIL LIST on the directory). This option may be used for *any* sequential file that you may have in your library.

DFReport Format File Structure

Report format files, created by DFReport and used for the purpose of producing printed reports in custom forms, will contain the following:

- Number of lines in report title.
- Data for each title line.
- Number of columns in the report.
- Position of each column.
- Header data for each column.
- Which datafile fields appear in each column.
- Whether or not totaling of the last column was chosen.

DFMail Format File Structure

Label format files, created by DFMail, are used to print Datafile records on labels. The custom label structure file contains the following:

- Number of rows on label.
- Which datafile fields appear in each row.

DFCalc Format File Structure

The calculated reports, simulating the types of reports produced by spreadsheets, are created by DFCalc. These format file structures contain the following data:

- Number of lines in report title.
- Data in each title line.
- Number of columns in report.
- Position of each column.
- Header data for each column.
- Contents of each column (datafile fields, rec# or equation).
- Equation(s) for column, if chosen.
- Justification of each column.
- End-of-column operation (totals, averages, NOOP).

DFStructure is especially useful when dealing with calculated reports, because it allows you to use information found in other report formats to help you design new formats. R

Address all author correspondence to Mike Konshak, 4821 Harvest Court, Colorado Springs, CO 80917.

Listing 1. *DFStructure program.*

```
4000 REM DFSTRUCTURE PROGRAM 1.0 - DATAFILE
      UTILITY BY MIKE KONSHAK (C)1985
                                  :REM*117
4002 POKE53281,0:POKE53280,8:PRINT"{CTRL 8}
     "                             :REM*61
4004 REM----DIM ARRAYS             :REM*11
4006 DIM F$(25),T%(25),L%(25),ML$(9,4)
                                   :REM*79
4008 DIM F(17),C$(17,15),PC(18),TT$(5),HC$(
     17)                           :REM*33
4010 FORI=1TO50:S$=S$+CHR$(32):D$=D$+".":B$
     =B$+"-":NEXTI                 :REM*81
4012 GOTO4032                     :REM*121
4014 REM----DISK ERROR CHECK      :REM*185
4016 INPUT#15,EN,EM$,ET,ES:IFEN<20OREN=62TH
     ENET=0:RETURN                :REM*195
4018 PRINT"{CRSR DN} {CTRL 9}{COMD 3}DISK E
     RROR{CTRL 0}"EN"{CRSR LF}, "EM$","ET"{
     CRSR LF},"ES"{CTRL 8}":ET=8   :REM*143
4020 PRINT"{CRSR DN} PRESS {CTRL 9}{COMD 6}
     ANY KEY{CTRL 8}{CTRL 0} TO CONTINUE":G
     OSUB4026                     :REM*231
4022 CLOSE5:CLOSE15:CLOSE4:RETURN  :REM*149
4024 REM----GET                   :REM*197
4026 GETA$:IFA$=""THEN4026        :REM*229
4028 RETURN                         :REM*5
4030 REM----OPENING SCREEN        :REM*229
4032 PRINT"{SHFT CLR} {CTRL 9}{5 SPACEs}DAT
     AFILE STRUCTURE DUMP{10 SPACEs}{CTRL 0
     }"                           :REM*221
4034 PRINT"{CRSR DN}{3 SPACEs}THIS PROGRAM
     WILL READ AND DISPLAY"       :REM*147
4036 PRINT"{5 SPACEs}THE STRUCTURE OF DATAF
     ILES AND"                    :REM*237
4038 PRINT"{4 SPACEs}PRINTER FORMAT FILES C
     REATED BY:"                   :REM*31
4040 PRINT"{CRSR DN}{4 SPACEs}{CTRL 9}DATAF
     ILE{CTRL 0} AND ITS SUBPROGRAMS:"
                                  :REM*239
4042 PRINT"{CRSR DN}{9 SPACEs}{CTRL 9}DFREP
     ORT{CTRL 0} AND {CTRL 9}DFMAIL{CTRL 0}
     ,"                            :REM*53
4044 PRINT"{CRSR DN}{3 SPACEs}AS WELL AS TH
     E COMPANION PROGRAM:"        :REM*123
```

```
4046 PRINT"{CRSR DN}{16 SPACEs}{CTRL 9}DFCA
     LC{CTRL 0}"                   :REM*95
4048 PRINT"{CRSR DN}{3 SPACEs}THE {CTRL 9}D
     ATAFILE{CTRL 0} SERIES IS WRITTEN BY:"
                                  :REM*109
4050 PRINT"{CRSR DN}{12 SPACEs}MIKE KONSHAK
     "                            :REM*171
4052 PRINT"{9 SPACEs}4821 HARVEST COURT"
                                  :REM*121
4054 PRINT"{5 SPACEs}COLORADO SPRINGS, CO.
     80917"                       :REM*191
4056 PRINT"{CRSR DN}{4 SPACEs}AND PUBLISHED
      IN {CTRL 9}RUN MAGAZINE{CTRL 0}"
                                  :REM*255
4058 PRINT"{2 CRSR DNs}{5 SPACEs}PRESS {CTR
     L 9}{COMD 6}ANY KEY{CTRL 8}{CTRL 0} TO
      CONTINUE":GOSUB4026         :REM*157
4060 REM----SELECTION SCREEN      :REM*231
4062 PRINT"{SHFT CLR} {CTRL 9}{2 SPACEs}DAT
     AFILE OR FORMAT FILE SELECTION{3 SPACE
     s}{CTRL 0}"                   :REM*95
4064 PRINT"{2 CRSR DNs}{6 SPACEs}{CTRL 9}D{
     CTRL 0}ATAFILE RECORD FILES"  :REM*171
4066 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}R{CTR
     L 0}EPORT FORMAT FILES"      :REM*161
4068 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}M{CTR
     L 0}AILING LABEL FORMAT FILES":REM*127
4070 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}C{CTR
     L 0}ALCULATED REPORT FORMAT FILES"
                                  :REM*159
4072 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}N{CTR
     L 0}ON-DATAFILE SEQUENTIAL FILE"
                                   :REM*67
4074 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}${CTR
     L 0} DISK DIRECTORY"          :REM*39
4076 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}Q{CTR
     L 0}UIT PROGRAM"             :REM*125
4078 PRINT"{CRSR DN} {CTRL 9}{7 SPACEs}PRES
     S THE APPROPRIATE KEY{6 SPACEs}{CTRL 0
     }"                           :REM*161
4080 GOSUB4026:K=0:IFA$="Q"THENPRINT"{SHFT
     CLR}":END                    :REM*239
4082 IFA$="D"THENK=1              :REM*197
4084 IFA$="R"THENK=2              :REM*223
4086 IFA$="M"THENK=3              :REM*109
4088 IFA$="C"THENK=4              :REM*123
4090 IFA$="N"THENK=5               :REM*19
4092 IFA$="$"THEN4494             :REM*115
```

→

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Listing 1 continued.

```
4094 IFK<=0ORK>5THEN4080                 :REM*189
4096 REM----GET NAME OF FILE             :REM*250
4098 PRINT"{CRSR DN} ENTER NAME OF SEQUENTI
     AL FILE:{CRSR DN}"                  :REM*100
4100 PRINT" ? "NF$:INPUT"{CRSR UP} ";NF$:IF
     NF$=""THEN4062                      :REM*180
4102 FL=0:ONKGOTO4106,4188,4270,4328,4416
                                         :REM*218
4104 REM----READ DATAFILE SEQ FILE :REM*216
4106 OPEN15,8,15                         :REM*188
4108 OPEN5,8,5,"0:DF] "+NF$+",S,R":GOSUB401
     6:IFET=8THEN4062                    :REM*246
4110 IFEN=62THENGOSUB4018:GOTO4062 :REM*218
4112 INPUT#5,R,F,X:GOSUB4016:IFET=8THEN4062
                                         :REM*160
4114 IFFL=1THEN4118                      :REM*216
4116 :                                   :REM*12
4118 FORI=1TOF:INPUT#5,F$(I),L%(I):NEXTI:GO
     SUB4016:IFET=8THEN4062              :REM*216
4120 IFFL=1THEN4154                      :REM*206
4122 PRINT"{SHFT CLR}{CTRL 8} {CTRL 9}{2 SP
     ACEs}STRUCTURE OF DATAFILE{2 SPACEs}{C
     TRL 2}"NF$                          :REM*130
4124 PRINT"{CTRL 8}{CRSR DN} # RECORDS POSS
     IBLE IN FILE {CTRL 2}{CTRL 9}"R
                                         :REM*220
4126 PRINT"{CTRL 8} # RECORDS IN CURRENT FI
     LE{2 SPACEs}{CTRL 2}{CTRL 9}"X:REM*234
4128 PRINT"{CTRL 8} # FIELDS IN EACH RECORD
     {4 SPACEs}{CTRL 2}{CTRL 9}"F   :REM*26
4130 PRINT"{CTRL 8} {CTRL 9} #{3 SPACEs}TIT
     LE OF FIELDS{12 SPACEs}LENGTH" :REM*52
4132 FORI=1TOF                           :REM*36
4134 PRINT"{CTRL 8} {CTRL 9}"I"{CTRL 0}{CTR
     L 2}"TAB(6)LEFT$(F$(I)+D$,27)TAB(33)L%
     (I)                                 :REM*76
4136 NEXTI                               :REM*140
4138 PRINT"{CTRL 8}{CRSR DN} {CTRL 9}S{CTRL
      0}CAN RECORDS {CTRL 9}P{CTRL 0}RINT S
     TRUCTURE {CTRL 9}E{CTRL 0}XIT":REM*198
4140 GOSUB4026:IFA$="E"THENCLOSE5:CLOSE15:G
     OTO4062                             :REM*102
4142 IFA$="P"THEN4170                     :REM*4
4144 IFA$="S"THEN4150                    :REM*104
4146 GOTO4140                            :REM*176
4148 REM----SCAN RECORDS                 :REM*144
4150 PRINT"{CRSR DN} PRESS {CTRL 9}CTRL{CTR
     L 0} SLOW {CTRL 9}F7{CTRL 0} START/STO
     P {CTRL 9}F1{CTRL 0} EXIT":GOSUB4026
                                         :REM*68
4152 IFFL=1THEN4106                      :REM*234
4154 FORI=1TOX:PRINT"{CTRL 8} {CTRL 9}RECOR
     D "I                                :REM*140
4156 FORJ=1TOF:INPUT#5,REC$:PRINT"{CTRL 8}
     "J"{CTRL 2}"REC$:NEXTJ              :REM*210
4158 GETA$:IFA$="{FUNCT 1}"THEN4166:REM F1
                                         :REM*116
4160 IFA$="{FUNCT 7}"THENGOSUB4026:REM F7
                                         :REM*36
4162 NEXTI                               :REM*166
4164 PRINT"{CTRL 8} PRESS {CTRL 9}ANY KEY{C
     TRL 0} TO CONTINUE{CTRL 2}":GOSUB4026
                                         :REM*168
4166 CLOSE5:CLOSE15:FL=1:GOTO4122  :REM*228
4168 REM----PRINT DATAFILE STRUCTURE:REM*40
4170 OPEN4,4:PRINT#4,"{3 SPACEs}STRUCTURE F
     OR DATAFILE ** "NF$" **"            :REM*174
4172 PRINT#4,B$:PRINT#4,"# RECORDS POSSIBLE
      IN FILE:"R                         :REM*158
4174 PRINT#4,"# RECORDS IN CURRENT FILE :"X
                                         :REM*148
4176 PRINT#4,"# FIELDS IN EACH RECORD{3 SPA
     CEs}:"F:PRINT#4,B$                  :REM*210
4178 PRINT#4," #{2 SPACEs}TITLE OF FIELDS{1
     2 SPACEs}LENGTH":PRINT#4,B$   :REM*218
4180 FORI=1TOF                           :REM*84
4182 PRINT#4,ILEFT$(F$(I)+D$,27)L%(I)
                                         :REM*22
4184 NEXTI:PRINT#4,B$:PRINT#4:CLOSE4:GOTO41
     22                                  :REM*174
4186 REM----READ DFREPORT STRUCTURE:REM*254
4188 OPEN15,8,15                         :REM*14
4190 OPEN5,8,5,"0:RP] "+NF$+",S,R":GOSUB401
     6:IFET=8THEN4062                    :REM*108
4192 IFEN=62THENGOSUB4018:GOTO4062  :REM*44
4194 INPUT#5,PW,NL,NC:GOSUB4016:IFET=8THEN4
     062                                 :REM*120
4196 FORI=1TONL:INPUT#5,TT$(I):NEXTI:GOSUB4
     016:IFET=8THEN4062                  :REM*130
4198 FORI=1TONC:INPUT#5,PC(I),HC$(I)
                                         :REM*172
4200 FORJ=1TO3:INPUT#5,ML$(I,J):NEXTJ:NEXTI
     :GOSUB4016:IFET=8THEN4062           :REM*86
4202 INPUT#5,A1$:GOSUB4016:IFET=8THEN4062
                                         :REM*40
4204 CLOSE5:CLOSE15                      :REM*70
4206 REM----DISPLAY DFREPORT STRUCTURE
                                         :REM*250
4208 PRINT"{SHFT CLR}{CTRL 8} {CTRL 9}STRUC
     TURE OF DFREPORT FORMAT:{CTRL 2}"NF$
                                         :REM*210
4210 PRINT"{CTRL 8}{CRSR DN} # LINES IN REP
     ORT TITLE {CTRL 2}{CTRL 9}"NL :REM*130
4212 FORI=1TONL:PRINT"{CTRL 8} {CTRL 9}"I;"
     {CTRL 0}{CTRL 2}"TT$(I):NEXTI  :REM*14
4214 PRINT"{CTRL 8} # COLUMNS IN REPORT{5 S
     PACEs}{CTRL 2}{CTRL 9}"NC      :REM*140
4216 PRINT"{CTRL 8} {CTRL 9} # POS COLUMN H
     EADER{6 SPACEs}CONTENTS{4 SPACEs}"
                                         :REM*134
4218 FORI=1TONC                          :REM*194
4220 PRINT"{CTRL 8} {CTRL 9}"I"{CTRL 0}{CTR
     L 2}"TAB(2)PC(I)TAB(8)LEFT$(HC$(I),18)
     ;                                   :REM*148
4222 PRINTTAB(27)"{CTRL 8}FIELDS:{CTRL 2}"M
     L$(I,1)"+"ML$(I,2)"+"ML$(I,3) :REM*250
4224 NEXTI:IFA1$<>"1"THEN4228            :REM*24
4226 PRINT"{CRSR DN}{CTRL 8} COLUMN{CTRL 2}
     "NC"{CRSR LF}{CTRL 8}, IS TO BE TOTALE
     D":GOTO4230                         :REM*106
4228 PRINT"{CRSR DN}{CTRL 8} NO TOTALING OF
      COLUMNS"                           :REM*114
4230 PRINT"{CTRL 8}{CRSR DN} {CTRL 9}P{CTRL
      0}RINT STRUCTURE {CTRL 9}E{CTRL 0}XIT
     "                                   :REM*170
4232 GOSUB4026:IFA$="E"THEN4062     :REM*190
4234 IFA$="P"THEN4240                     :REM*56
4236 GOTO4232                            :REM*122
4238 REM----PRINT DFREPORT STRUCTURE:REM*52
4240 OPEN4,4                              :REM*8
4242 PRINT#4,"{3 SPACEs}STRUCTURE OF DFREPO
     RT FORMAT ** "NF$" **"              :REM*212
4244 PRINT#4,B$:PRINT#4,"# LINES IN REPORT
     TITLE:"NL:PRINT#4,B$                :REM*242
4246 FORI=1TONL:PRINT#4,"TITLE"I;": "TT$(I)
     :NEXTI:PRINT#4,B$                   :REM*244
4248 PRINT#4,"# COLUMNS IN REPORT{4 SPACEs}
     :"NC:PRINT#4,B$                     :REM*254
4250 PRINT#4," #{2 SPACEs}POS{2 SPACEs}HEAD
     ER{14 SPACEs}CONTENTS":PRINT#4,B$
                                         :REM*66
4252 FORI=1TONC                          :REM*228
4254 PRINT#4,RIGHT$(S$+STR$(I),3)+RIGHT$(S$
     +STR$(PC(I)),4);                    :REM*230
4256 PRINT#4,".."LEFT$(HC$(I)+D$,20);
                                         :REM*242
4258 PRINT#4,"DATAFILE FIELDS:"ML$(I,1)"+"M
     L$(I,2)"+"ML$(I,3)                  :REM*124
4260 NEXTI:PRINT#4,B$:IFA1$<>"1"THEN4264
                                         :REM*120
```

→

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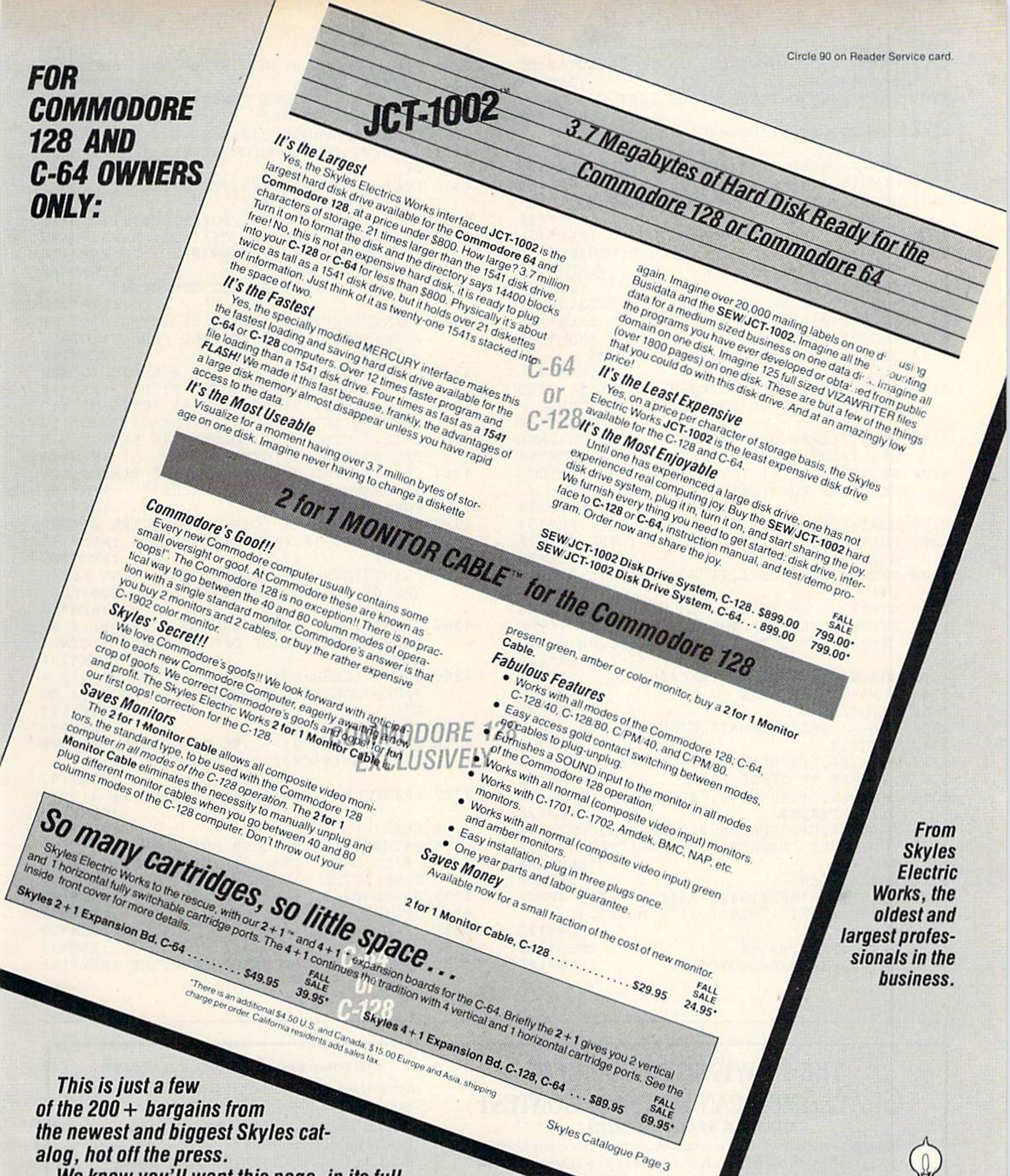

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Listing 1 continued.

```
4262 PRINT#4,"COLUMN"NC", IS TO BE TOTALED"
     :GOTO4266                         :REM*70
4264 PRINT#4,"NO TOTALING OF LAST COLUMN"
                                       :REM*100
4266 PRINT#4,B$:PRINT#4:CLOSE4:GOTO4232
                                       :REM*70
4268 REM----READ DFMAIL STRUCTURE    :REM*128
4270 OPEN15,8,15                       :REM*96
4272 OPEN5,8,5,"0:ML] "+NF$+",S,R":GOSUB401
     6:IFET=8THEN4062                  :REM*236
4274 IFEN=62THENGOSUB4018:GOTO4062  :REM*126
4276 INPUT#5,RW:GOSUB4016:IFET=8THEN4062
                                       :REM*186
4278 FORI=1TORW                        :REM*20
4280 FORJ=1TO3:INPUT#5,ML$(I,J):NEXTJ:NEXTI
     :GOSUB4016:IFET=8THEN4062         :REM*166
4282 CLOSE5:CLOSE15                    :REM*148
4284 REM----DISPLAY DFMAIL STRUCTURE
                                       :REM*226
4286 PRINT"{SHFT CLR}{CTRL 8} {CTRL 9} STRU
     CTURE OF DFMAIL FORMAT:{CTRL 2}"NF$
                                       :REM*134
4288 PRINT"{CRSR DN}{CTRL 8} # ROWS ON LABE
     L{2 SPACEs}{CTRL 2}{CTRL 9}"RW :REM*58
4290 PRINT"{CTRL 8} {CTRL 9} #{2 SPACEs}CON
     TENTS OF ROW (DATAFILE FIELDS)"
                                       :REM*214
4292 FORI=1TORW                        :REM*34
4294 PRINT"{CTRL 8} {CTRL 9}"I"{CTRL 0}{CTR
     L 2}";                            :REM*92
4296 PRINTTAB(6)ML$(I,1)"+"ML$(I,2)"+"ML$(I
     ,3)                               :REM*246
4298 NEXTI                             :REM*46
4300 PRINT"{CTRL 8}{CRSR DN} {CTRL 9}P{CTRL
      0}RINT STRUCTURE {CTRL 9}E{CTRL 0}XIT
     "                                 :REM*240
4302 GOSUB4026:IFA$="E"THEN4062        :REM*4
4304 IFA$="P"THEN4310                  :REM*86
4306 GOTO4286                          :REM*100
4308 REM----PRINT DFMAIL STRUCTURE :REM*228
4310 OPEN4,4                           :REM*78
4312 PRINT#4,"{3 SPACEs}STRUCTURE OF DFMAIL
      FORMAT ** "NF$" **"              :REM*76
4314 PRINT#4,B$:PRINT#4,"# ROWS ON LABEL:"R
     W:PRINT#4,B$                      :REM*28
4316 PRINT#4,"{2 SPACEs}#{3 SPACEs}CONTENTS
      OF LABEL (DATAFILE FIELDS)":PRINT#4,B
     $                                 :REM*100
4318 FORI=1TORW                        :REM*60
4320 PRINT#4,RIGHT$(S$+STR$(I),3)+"{3 SPACE
     s}"ML$(I,1)"+"ML$(I,2)"+"ML$(I,3)
                                       :REM*122
4322 NEXTI:PRINT#4,B$                  :REM*172
4324 PRINT#4:CLOSE4:GOTO4286           :REM*188
4326 REM----READ DFCALC STRUCTURE   :REM*242
4328 OPEN15,8,15                       :REM*154
4330 OPEN5,8,5,"0:CR] "+NF$+",S,R":GOSUB401
     6:IFET=8THEN4062                  :REM*70
4332 IFEN=62THENGOSUB4018:GOTO4062 :REM*184
4334 INPUT#5,PW,NL,NC:GOSUB4016:IFET=8THEN4
     062                               :REM*4
4336 FORI=1TONL:INPUT#5,TT$(I):NEXTI:GOSUB4
     016:IFET=8THEN4062                :REM*14
4338 FORI=1TONC:INPUT#5,PC(I),HC$(I):REM*56
4340 FORJ=0TO14:INPUT#5,C$(I,J):NEXTJ:NEXTI
     :GOSUB4016:IFET=8THEN4062         :REM*118
4342 CLOSE5:CLOSE15                    :REM*208
4344 REM----DISPLAY DFCALC STRUCTURE
                                       :REM*216
4346 PRINT"{SHFT CLR}{CTRL 8} {CTRL 9}{2 SP
     ACEs}STRUCTURE OF DFCALC FORMAT:{CTRL
     2}"NF$                            :REM*112
4348 PRINT"{CTRL 8}{CRSR DN} # LINES IN REP
     ORT TITLE {CTRL 2}{CTRL 9}"NL  :REM*12
4350 FORI=1TONL:PRINT"{CTRL 8} {CTRL 9}"I;"
     {CTRL 0}{CTRL 2}"TT$(I):NEXTI :REM*152
4352 PRINT"{CTRL 8} # COLUMNS IN REPORT{5 S
     PACEs}{CTRL 2}{CTRL 9}"NC         :REM*23
4354 PRINT"{CTRL 8} {CTRL 9} #{2 SPACEs}POS
     {3 SPACEs}HEADER{22 SPACEs}"  :REM*113
4356 FORI=1TONC                        :REM*77
4358 PRINT"{CTRL 8} {CTRL 9}"I"{CTRL 0}{CTR
     L 2}"TAB(5)PC(I)TAB(10)HC$(I) :REM*149
4360 NEXTI                             :REM*109
4362 PRINT"{CTRL 8} PRESS {CTRL 9}ANY KEY{C
     TRL 0} TO SEE MORE{CTRL 2}":GOSUB4026
                                       :REM*27
4364 PRINT"{SHFT CLR}{CTRL 8} {CTRL 9}{2 SP
     ACEs}STRUCTURE OF DFCALC FORMAT:{CTRL
     2}"NF$                            :REM*131
4366 PRINT"{CRSR DN}{CTRL 8} {CTRL 9} #{2 S
     PACEs}CONTENTS/EQUATION{12 SPACEs}J EO
     C"                                :REM*133
4368 FORI=1TONC                        :REM*89
4370 PRINT"{CTRL 8} {CTRL 9}"I"{CTRL 0}{CTR
     L 2}"TAB(5)C$(I,1)TAB(9)C$(I,14);
                                       :REM*143
4372 PRINTTAB(34)C$(I,0)TAB(38)C$(I,13)
                                       :REM*135
4374 NEXTI                             :REM*123
4376 PRINT"{CTRL 8}{CRSR DN} {CTRL 9}S{CTRL
      0}EE LAST {CTRL 9}P{CTRL 0}RINT STRUC
     TURE {CTRL 9}E{CTRL 0}XIT"     :REM*191
4378 GOSUB4026:IFA$="E"THEN4062       :REM*81
4380 IFA$="S"THEN4346                  :REM*21
4382 IFA$="P"THEN4388                  :REM*23
4384 GOTO4378                          :REM*33
4386 REM----PRINT DFCALC STRUCTURE :REM*159
```

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Listing 1 continued.

```
4388 OPEN4,4:C$=LEFT$(B$+B$,71)    :REM*165
4390 PRINT#4,"{11 SPACEs}STRUCTURE OF DFCAL
     C FORMAT ** "NF$" **"          :REM*85
4392 PRINT#4,C$:PRINT#4,"# LINES IN REPORT
     TITLE:"NL:PRINT#4,C$          :REM*175
4394 FORI=1TONL:PRINT#4,"TITLE"I;": "TT$(I)
     :NEXTI:PRINT#4,C$               :REM*9
4396 PRINT#4,"# COLUMNS IN REPORT:"NC:PRINT
     #4,C$                         :REM*115
4398 PRINT#4,"{2 SPACEs}# POS{2 SPACEs}HEAD
     ER{14 SPACEs}CONTENTS";       :REM*167
4400 PRINT#4,"/EQUATION{16 SPACEs}JUST{2 SP
     ACEs}EOC":PRINT#4,C$          :REM*211
4402 FORI=1TONC                    :REM*123
4404 PRINT#4,RIGHT$(S$+STR$(I),3)+RIGHT$(S$
     +STR$(PC(I)),4);              :REM*125
4406 PRINT#4,".."LEFT$(HC$(I)+D$,20)+LEFT$(
     C$(I,1)+D$,3);                :REM*167
4408 PRINT#4,LEFT$(C$(I,14)+D$,31)+LEFT$(C$
     (I,0)+D$,6)+C$(I,13)           :REM*29
4410 NEXTI:PRINT#4,C$                :REM*7
4412 CLOSE4:GOTO4364               :REM*141
4414 REM----READ GENERIC SEQUENTIAL FILE
                                   :REM*167
4416 OPEN15,8,15                   :REM*243
4418 OPEN5,8,5,"0:"+NF$+",S,R":GOSUB4016:IF
     ET=8THEN4062                  :REM*141
4420 IFEN=62THENGOSUB4018:GOTO4062   :REM*17
4422 CLOSE5:CLOSE15                  :REM*33
4424 PRINT"{SHFT CLR} {CTRL 9}GENERIC SEQUE
     NTIAL FILE READER{CTRL 0}"    :REM*201
4426 PRINT"{CRSR DN} DATA FROM FILE CHOSEN
     WILL BE PRINTED"              :REM*107
4428 PRINT" IN ONE COLUMN, AS THE FILE IS R
     EAD."                         :REM*159
4430 PRINT"{2 CRSR DNs} SEND TO {CTRL 9}S{C
     TRL 0}CREEN OR {CTRL 9}P{CTRL 0}RINTER
     ? OR {CTRL 9}E{CTRL 0}XIT"    :REM*157
4432 GOSUB4026:IFA$="E"THEN4062    :REM*135
4434 IFA$="S"THEN4442              :REM*211
4436 IFA$="P"THEN4464              :REM*179
4438 GOTO4432                      :REM*101
4440 REM----SCREEN PRINT           :REM*195
4442 PRINT"{SHFT CLR}{CRSR DN} PRESS {CTRL
     9}CTRL{CTRL 0} SLOW {CTRL 9}F7{CTRL 0}
      START/STOP {CTRL 9}F1{CTRL 0} EXIT":G
     OSUB4026                       :REM*51
4444 OPEN15,8,15                    :REM*15
4446 OPEN5,8,5,"0:"+NF$+",S,R":GOSUB4016:IF
     ET=8THEN4062                  :REM*169
4448 IFEN=62THENGOSUB4018:GOTO4062   :REM*45
4450 GET#5,Z$:IFST<>0THEN4460        :REM*31
4452 PRINTZ$;                       :REM*87
4454 GETA$:IFA$="{FUNCT 7}"THENGOSUB4026
                                   :REM*105
4456 IFA$="{FUNCT 1}"THENGOTO4460  :REM*227
4458 GOTO4450                       :REM*57
4460 CLOSE5:CLOSE15                 :REM*71
4462 GOTO4488                      :REM*161
4464 REM----HARDCOPY               :REM*119
4466 OPEN4,4:OPEN15,8,15           :REM*141
4468 OPEN5,8,5,"0:"+NF$+",S,R":GOSUB4016:IF
     ET=8THEN4062                  :REM*191
4470 IFEN=62THENGOSUB4018:GOTO4062   :REM*67
4472 PRINT"{SHFT CLR}{CRSR DN} PRESS {CTRL
     9}CTRL{CTRL 0} SLOW {CTRL 9}F7{CTRL 0}
      START/STOP {CTRL 9}F1{CTRL 0} EXIT{CR
     SR UP}":GOSUB4026             :REM*175
4474 PRINT#4,"SEQUENTIAL FILE ** "NF$" **":
     PRINT#4,B$                    :REM*155
4476 GET#5,Z$:IFST<>0THEN4486      :REM*113
4478 PRINT#4,Z$;                    :REM*73
4480 GETA$:IFA$="{FUNCT 7}"THENGOSUB4026
                                   :REM*131
4482 IFA$="{FUNCT 1}"THENGOTO4486  :REM*193
4484 GOTO4476                       :REM*21
4486 PRINT#4,B$                    :REM*175
4488 CLOSE5:CLOSE15:CLOSE4         :REM*175
4490 PRINT" PRESS {CTRL 9}ANY KEY{CTRL 0} T
     O CONTINUE{12 SPACEs}":GOSUB4026:GOTO4
     424                           :REM*121
4492 REM----DIRECTORY              :REM*185
4494 OPEN15,8,15:OPEN5,8,0,"$0":PRINT"{SHFT
      CLR}":GOSUB4016:IFET=8THEN4062:REM*27
4496 GET#5,A1$,A2$                  :REM*89
4498 GET#5,A1$,A2$                  :REM*91
4500 GET#5,A1$,A2$                  :REM*93
4502 IFA1$<>""THENA0=ASC(A1$)      :REM*231
4504 IFA2$<>""THENA0=A0+ASC(A2$)*256
                                   :REM*187
4506 PRINTMID$(STR$(A0),2);TAB(3);  :REM*11
4508 GET#5,A2$:IFST<>0THEN4526      :REM*11
4510 IFA2$<>CHR$(34)THEN4508       :REM*167
4512 GET#5,A2$:IFA2$<>CHR$(34)THENPRINT"{CT
     RL 9}"A2$"{CTRL 0}";:GOTO4512 :REM*253
4514 GET#5,A2$:IFA2$=CHR$(32)THEN4514
                                    :REM*89
4516 PRINTTAB(20);:A3$=""          :REM*237
4518 A3$=A3$+A2$:GET#5,A2$:IFA2$<>""THEN451
     8                              :REM*89
4520 PRINTLEFT$(A3$,3)              :REM*35
4522 GETA$:IFA$<>""THENGOSUB4530   :REM*171
4524 IFST=0THEN4498                 :REM*67
4526 PRINT" BLOCKS FREE";:A0=0     :REM*249
4528 CLOSE5:CLOSE15:PRINTTAB(25)"PRESS {CTR
     L 9}ANY KEY{CTRL 0}":GOSUB4026:GOTO406
     2                              :REM*23
4530 GOSUB4026:RETURN               :REM*31
```

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Easy Assembly VII

By WILLIAM B. SANDERS

This month's installment deals with three fundamental programming structures—sequence, branch and loop—and the opcodes to use them.

For those of you with C-128s, the following routines can be entered with your C-128's machine language monitor and run in the C-64 mode. However, everything will be automatically converted into hexadecimal. Remember, if a number in any of these listings does not have a dollar sign ($) in front of it, it is decimal. When using your C-128 monitor, just put a plus sign (+) in front of all decimal numbers.

For example, if you see

```
LDA #49 (or LDA# 49)
```

you should enter:

```
LDA #+49
```

Read the C-128's *System Guide* for details on entering code with the built-in mini-assembler. The first listing in this article shows how to enter code in the C-128 format used in the mini-assembler. Programs beginning at 49152 should be begun at $C000 in your C-128 monitor.

I won't elaborate on the C-128 mode here, as it would be a bit confusing. However, you will be able to transfer a lot of the material in this column to the C-128 mode, since both microprocessors (6510 and 8502) use the same opcodes. Just be patient and enjoy learning about assembly language programming.

Toward Simpler Programming

As you learn more about programming in assembly language, you'll find simpler, quicker and less cumbersome solutions to problems. For example, consider two Basic programs that count to 10. A *simple* solution would be to have something like this:

```
10 FOR X=1 TO 10 : PRINT X : NEXT X
```

A more complex solution would be to have a program that required the programmer to do all the work, as illustrated in the following.

```
10 PRINT 1
20 PRINT 2
30 etc.
```

The first example uses the *loop* structure; the second uses a *sequential* structure. Up to this point, you've been using the less-elegant *sequential* structure, since you haven't learned how to use opcodes that allow you to take advantage of the other structures. The three structures I'll cover here are sequence, branch and loop.

The Sequence

In flowcharting, a sequence can be diagrammed as a sequential arrangement of tasks:

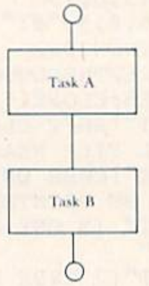

Figure 1. *Sequential Structure flowchart.*

The following is an example that counts from 1 to 3.

```
LN LABEL OPCODE OPERAND COMMENT
-------------------------------
1        JSR    $E544   TASK A
2        LDA    #49     TASK B
3        JSR    $E716   TASK C
4        LDA    #50     TASK D
5        JSR    $E716   TASK E
6        LDA    #51     TASK F
7        JSR    $E716   TASK G
8        RTS            TASK H
```

```
ADRS   OPCODE OPERAND
--------------------
49152  JSR    $E544
49155  LDA#   49
49157  JSR    $E716
49160  LDA#   50
49162  JSR    $E716
49165  LDA#   51
49167  JSR    $E716
49170  RTS
```

```
A C000 JSR E544
A C003 LDA #+49
A C005 JSR E716
A C008 LDA #+50
A C00A JSR E716
A C00D LDA #+51
A C00F JSR E716
A C012 RTS
```

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So far, there's nothing you don't already know. The sequence goes from one task to the next. Further on, you'll see how to accomplish the same task with a loop. First, though, you must learn branching and the opcodes used therein.

The Branch

In Basic, you know that the branch is a decision point at which you can take more than a sequential step. For example, the following uses a simple branch structure:

```
10 INPUT "ENTER 'Y' OR 'N' ";YN$
20 IF YN$="Y" THEN GOTO 100
30 IF YN$="N" THEN GOTO 200
40 END
100 PRINT "YES" : END
200 PRINT "NO" : END
```

In a flowchart diagram, it would look like this:

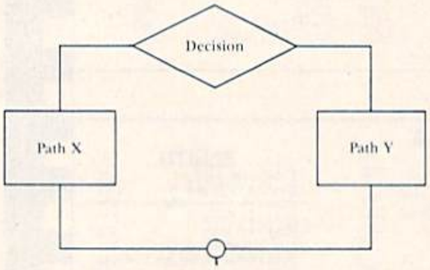

Figure 2. *Branch Structure flowchart.*

Now you'll have to learn to compare and branch. The "compare" opcodes compare either the contents of the A, X or Y register with an immediate value or the contents of an address. Let's examine the use of compare in the Immediate mode.

CMP	Compare with the contents of the accumulator
CPX	Compare with the contents of the X register
CPY	Compare with the contents of the Y register

Once a comparison has been made, it's necessary to tell the program to jump out of sequence. This is done with "branch" opcodes. Let's look at two that are used in conjunction with the compare opcodes.

BNE	Branch if the value is Not Equal
BEQ	Branch if the value is Equal

In the following example, I'm going to show the importance of using labels for branching and the sequence of the compare and branch instructions.

```
LN LABEL OPCODE OPERAND COMMENT
--------------------------------
 1        JSR    $E544
 2        LDA    #89       "Y"
 3        CMP    #89       "Y"?
 4        BEQ    YES       If="Y"
 5        CMP    #78       "N"?
 6        BEQ    NO        If="N"
 7        RTS
 8 YES    LDA    #2        TASK X
 9        STA    $D020
10        RTS
11 NO     LDA    #5        TASK Y
12        STA    $D021
13        RTS
```

(*Before you run this program, see if you can guess what will happen.)

```
ADRS   OPCODE OPERAND
---------------------
49152  JSR    $E544
49155  LDA#   89
49157  CMP#   89
49159  BEQ    49166
49161  CMP#   78
49163  BEQ    49172
49165  RTS
49166  LDA#   2
49168  STA    $D020
49171  RTS
49172  LDA#   5
49174  STA    $D021
49177  RTS
```

Let's see what happened. The accumulator was loaded with the value 89, the ASCII value for Y. Then, in line 3, the value in the accumulator was compared with 89. Since the value was the same as the accumulator, the program branched to YES, by jumping over lines 5–7. (YES is just an address, but it's a lot easier to use than first having to figure out the branch address, as we did in the second program listing.)

The YES line loads the accumulator with a 2 and puts it in the border color register, turning it red. The RTS instruction in the next line then ends the program in line 10 instead of continuing through line 13. To test this procedure yourself, clear the screen to the default colors and change the value in line 2 from 89 to 78. This should turn the background color green and leave the border color alone.

The Loop

In assembly language programming, a loop is really a type of branch. Basically, the program branches back to an address to execute the same code a number of times. By comparing a value in the loop, the program can adjust the number of times the loop is performed. The following is the flowchart representation of a loop.

Continued on p. 130.

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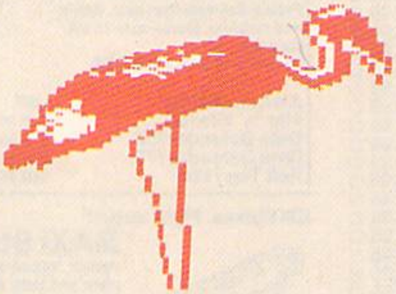

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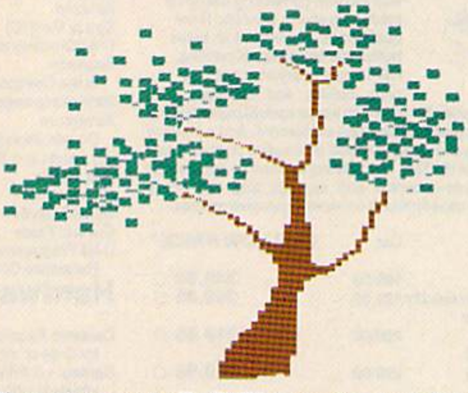

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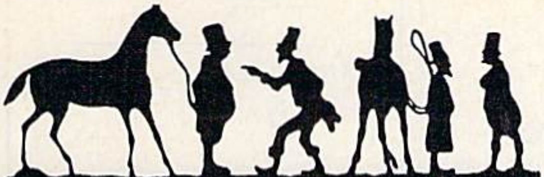

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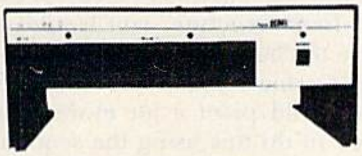

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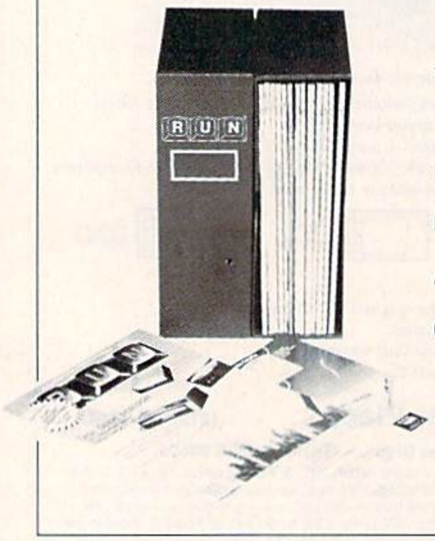

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From p. 126.

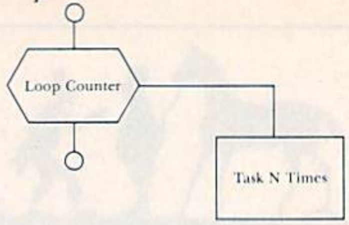

Figure 3. *Loop Structure flowchart.*

```
LN LABEL OPCODE OPERAND COMMENT
----------------------------------------
1          JSR    $E544
2          LDX    #49
3 LOOP     TXA
4          JSR    $E716
5          INX
6          CMP    #51      51 YET?
7          BNE    LOOP     LOOP IF NOT
8          RTS
```

```
     ADRS   OPCODE OPERAND
     ---------------------
     49152  JSR    $E544
     49155  LDX#   49
     49157  TXA
     49158  JSR    $E716
     49161  INX
     49162  CMP#   51
     49164  BNE    49157
     49166  RTS
```

Compare the above listing with the first one in this article. Both programs took eight lines of code to print "123" at the top of the screen. In terms of using the loop structure over the simple sequential structure, this may initially seem like no saving at all.

However, let's say you wanted to "count" to 9 instead of to just 3. Using the loop structure, you would only have to change line 6 from 51 to 58. Thus, using the same amount of code, you could print a lot more. If you tried to do this using the sequential structure, you would need to add a lot more lines of code.

As you use more sophisticated structures in programming, you'll continue moving from the complex to the simple. Now, let's see if you can print the entire alphabet by changing only lines 2 and 6.

Questions and Answers

Q: Can I run my machine and assembly language programs on a C-128?

A: Yes, but only in the C-64 mode. If you've been entering the programs we've had in this series, you can even transfer the object code to the C-128 monitor. Just type

```
LOAD "FILENAME",8,1
```

and enter the monitor. Enter D C000

<return>, and a disassembled listing of your code will appear. If you enter and assemble the code in the C-64 mode, and then return to the C-128 mode with a reset and enter the monitor, your code will appear!

Q: Are the Kernal and the other built-in routines the same in the C-128 as in the C-64, or am I going to have to learn a whole new set of jump addresses?

A: On the C-128, in the C-64 mode, everything is the same as on the C-64, including the Kernal addresses and other built-in routines.

However, if you plan on programming in the C-128 mode, be prepared to learn about bank switching. For instance, there's a register at $D020 that changes the border color of your C-64 and C-128. If you enter the monitor in the C-128 mode and put a value in *$0*D020, nothing happens. However, if you put a value in *$F*D020, you can watch the screen change.

To make matters more confusing, if, from Basic, you POKE 53280,N (53280 = $D020 with N being a value from 0–15) from *either* the C-128 or C-64 mode, you'll get a border color.

In short, you get 100% compatibility between the C-64 and the C-128 *if* the C-128 is in the C-64 mode. Otherwise, there are differences between the C-128 mode and C-64 mode in machine and assembly language programming.

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64 BasicAid

Here's a useful programming aid that lets you add Renumber, Find and Change to your list of Basic commands.

By ROBIN FRANZEL

The Commodore 64's full-screen editor makes it easy to write Basic programs. However, there are some features missing from the editor that would make you and your C-64 far more efficient. Even experienced programmers occasionally find the need to add more lines where there isn't any room. And the ability to find or change a string of characters makes debugging and corrections very easy!

BasicAid lets you add Renumber, Find and Change to your list of Basic commands. It resides in location $C400 and can operate concurrently with *RUN*'s previously published screen dump ("Print Your Screen," December 1984) and disk directory ("The Key to Your Disk Directory," August 1985) programs, as well as with the DOS wedge program. To enter the program, just type in the Basic loader (Listing 1) and save it. A checksum routine will indicate which lines, if any, have typing errors. Once you've correctly entered it, load and run it. The new commands now at your disposal are Renum, Find, Change and Reset.

Renumber Command

To renumber program lines, including all the Goto, Gosub and If...Then branch targets and multiple branches (as in "ON A GOTO 100,200,300"), use the Renum command. The Renum command will start the program with line 10 and renumber by ten. To begin at another line number, you may enter that line number after the Renum command. The increment will remain ten unless you specify otherwise by adding a comma and the increment amount. For example,

```
RENUM 100,5
```

will make the first line of your program 100, the next line 105, then 110 and so on. (It takes approximately five seconds to renumber a 10K Basic program.)

Find Command

To find a string of data in your program, use the Find command. The text you wish to find must be enclosed within delimiters. The delimiter may be any character. For example, to find each occurrence of the Print command, you could enter:

```
FIND /PRINT/
```

What if you wanted to find Goto, only as a command and not as a word in, say, a Print or REM statement? FIND /GOTO/ will find all Goto instructions, except for those within Print and REM statements. Since the interpreter will not try to tokenize a command when in Quote mode, you could also use a quote mark as your delimiter:

```
FIND "GOTO"
```

To be sure that you have found all of your selections, the program displays the word "hit" every time it finds what you requested. After finding eight of your selections, the program displays

```
CONTINUE Y/N
```

Y will display the next eight lines of "hits," then the message again, while N will return you to Command mode.

Change Command

The Change command works like the Find command, except that the text you want to locate and the text you want to put in your program should be separated by your delimiter. Let's say you've mistakenly used the variable A$ for two different reasons, so you want to change some of the A$ variables to COST$. Enter the following:

```
CHANGE /A$/COST$/
```

The first line with A$ will be displayed followed by the message:

```
U = UPDATE   C = CONTINUE   S = STOP
```

U will cause the line to be changed and redisplayed, and it will display the next occurrence of A$; C will not cause the line to be changed, but will display the next line; and S will return you to Basic.

RUN It Right

C-64; C-128 (in C-64 mode)

It's interesting to note the size limitation of the Find or Change strings. The buffer that holds the string is only ten characters long, but the length of the string is not necessarily limited to ten characters. For example,

```
FIND /PRINT"ENTER NUMBER"/
```

will trigger a String Too Long error, but

```
FIND /GOSUB10:GOSUB100:RETURN/
```

will not. This is because the Basic interpreter will convert Basic commands (unless within quotes) to a one-byte token, so that the latter example is only ten bytes long!

The only instance I can think of when you'd need to remove the BasicAid program from operation is when you want to load a machine language program that uses the same memory space. In that case, the system will crash because the Basic vector will cause a jump to code that isn't set up to handle input. Therefore, you must restore the vector to its original value by entering the Reset command. This will disable the new commands; if you want to reenable them, enter SYS 50176.

How the Program Works

A Basic wedge program usually changes the CHRGET routine so that the wedge can examine the characters in the input buffer. BasicAid achieves this a little differently. It changes the vector for the character dispatch in location $0308. This tokenizes the input and allows other programs that change the CHRGET routine, such as the wedge, to function concurrently with BasicAid.

Because this program actually changes memory where Basic resides, let's first see how a Basic program links in memory. Here's a one-line program in Basic:

```
10 PRINT:GOTO 10
```

In memory, this program will look like this:

$0801 0C 08	Address of next line (low byte, high byte)
$0803 0A 00	Current line number (low byte, high byte)
$0805 99	Token for Print command
$0806 3A	The colon (ASCII)
$0807 89	Token for Goto
$0808 20 31 30	Blank and branch target
$080B 00	End-of-line indicator
$080C 00 00	Next line, or end of program

Let's renumber the program. I built a table that contains the original hexadecimal line numbers and the new line numbers generated. If the line numbers get too big, then an error message will be displayed and the renumbering function will not work. I put the line number table under Basic, so that no memory will be wasted.

During the implementation of the line numbers, a search is made for the Goto, Gosub and Then tokens. If a line containing one of these tokens is found, then the token within the line is converted from ASCII to hex. The table is searched for a match; if one is found, a new number is generated, placed into a hold area and converted to ASCII. This ASCII number must now be placed in the program.

BasicAid moves your program to the top of Basic memory, then brings it back to Basic memory area one line at a time. This way, the program only needs to be shifted twice. It's shifted to allow for the new line number, which may be shorter or longer than the old number.

The Find command first validates the input, then compares the first character of the find string with each line of program code. If there is a match, then successive characters are checked until the end of the input buffer is reached. The line is then displayed.

If the Change command is invoked, then the difference in the lengths of the "from" and "to" strings is computed and the program is shifted left or right to provide the correct amount of space for the "to" string.

BasicAid is surely worth your typing time. However, if you'd rather not type it in and would like me to send you a copy on disk, just send me $3 and a self-addressed, stamped mailer. R

Address all author correspondence to Robin Franzel, 5521 Harvey Lane, Alexandria, VA 22312.

Listing 1. *BasicAid loader.*

```
10 DATA 169,24,141,8,3,169,196,141,9,3,96,1
   69,1128                            :REM*150
20 DATA 228,141,8,3,169,167,141,9,3,76,116,
   164,1225                           :REM*226
30 DATA 160,0,132,11,162,255,232,200,177,12
   2,56,253,1760                      :REM*254
40 DATA 166,201,240,246,201,128,240,18,232,
   189,166,201,2228                   :REM*128
50 DATA 16,250,230,11,160,0,189,167,201,208
   ,227,76,1735                        :REM*90
60 DATA 228,167,165,11,10,170,189,159,201,7
   2,189,158,1719                     :REM*248
70 DATA 201,72,96,169,255,208,2,169,0,141,6
   0,3,1376                            :REM*88
80 DATA 169,8,141,61,3,32,150,196,32,124,19
   8,160,1274                         :REM*190
90 DATA 4,32,1,197,176,45,32,45,197,173,60,
   3,965                              :REM*124
100 DATA 240,9,32,104,197,164,168,144,236,1
    76,28,32,1530                     :REM*238
110 DATA 146,198,176,23,160,4,206,61,3,208,
    222,169,1576                      :REM*156
120 DATA 8,141,61,3,32,148,197,224,89,208,4
    ,160,1275                          :REM*76
130 DATA 4,208,206,76,116,164,162,0,152,24,
    101,122,1335                      :REM*160
140 DATA 133,122,144,2,230,123,32,115,0,240
    ,80,201,1422                       :REM*38
150 DATA 32,240,247,141,62,3,32,115,0,240,6
    8,205,1385                         :REM*34
160 DATA 62,3,240,16,157,75,3,232,224,11,20
    8,238,1469                        :REM*126
170 DATA 32,115,0,205,62,3,208,52,138,240,4
    4,142,1241                        :REM*130
180 DATA 69,3,173,60,3,208,1,96,162,0,32,11
    5,922                             :REM*138
190 DATA 0,240,28,205,62,3,240,16,157,85,3,
    232,1271                           :REM*82
200 DATA 224,11,208,238,32,115,0,205,62,3,2
    08,12,1318                         :REM*84
210 DATA 138,240,4,142,70,3,96,104,104,76,8
    ,175,1160                         :REM*172
220 DATA 104,104,76,113,165,177,170,208,8,3
    2,146,198,1501                    :REM*214
230 DATA 160,4,144,245,96,162,0,221,75,3,24
    0,3,1353                          :REM*242
240 DATA 200,208,234,200,232,236,69,3,240,1
    1,177,170,1980                    :REM*244
```

→

Listing 1 continued.

```
250 DATA 240,223,221,75,3,240,240,208,216,1
    32,168,24,1990                      :REM*236
260 DATA 96,165,170,133,95,165,171,133,96,1
    73,0,3,1400                          :REM*63
270 DATA 72,173,1,3,72,169,13,32,210,255,16
    9,94,1263                           :REM*139
280 DATA 141,0,3,169,197,141,1,3,160,1,132,
    15,963                              :REM*175
290 DATA 200,177,170,170,200,177,170,133,21
    ,134,20,76,1648                     :REM*163
300 DATA 232,166,104,141,1,3,104,141,0,3,24
    ,96,1015                             :REM*37
310 DATA 169,127,162,201,32,174,197,32,207,
    255,201,13,1770                     :REM*173
320 DATA 240,3,170,208,246,224,85,240,12,22
    4,67,240,1959                         :REM*9
330 DATA 6,224,83,208,227,56,96,24,96,32,83
    ,200,1335                            :REM*21
340 DATA 32,17,201,32,45,197,144,243,169,10
    9,162,201,1552                       :REM*25
350 DATA 32,174,197,32,207,255,201,13,240,3
    ,170,208,1732                       :REM*235
360 DATA 246,224,78,240,4,224,89,208,231,96
    ,133,166,1939                       :REM*173
370 DATA 134,167,160,0,177,166,240,6,32,210
    ,255,200,1747                        :REM*19
380 DATA 208,246,96,200,177,122,240,36,24,1
    52,101,122,1724                     :REM*159
390 DATA 133,122,144,2,230,123,32,74,201,14
    0,61,3,1265                          :REM*93
400 DATA 141,62,3,160,0,177,122,240,21,32,2
    53,174,1385                         :REM*211
410 DATA 32,74,201,140,60,3,240,15,160,0,16
    9,10,1104                           :REM*177
420 DATA 141,61,3,140,62,3,169,10,141,60,3,
    32,825                              :REM*255
430 DATA 60,201,32,23,198,176,18,32,106,198
    ,32,178,1254                        :REM*103
440 DATA 198,32,106,198,32,207,198,32,124,1
    98,32,15,1372                        :REM*39
450 DATA 199,32,67,201,76,116,164,32,116,19
    8,160,3,1364                         :REM*33
460 DATA 177,170,145,180,136,177,170,145,18
    0,136,173,62,1851                   :REM*157
470 DATA 3,145,180,136,173,61,3,145,180,24,
    165,180,1395                        :REM*105
480 DATA 105,4,133,180,144,2,230,181,32,146
    ,198,144,1499                        :REM*43
490 DATA 11,160,3,169,0,145,180,136,16,251,
    24,96,1191                           :REM*99
500 DATA 173,60,3,109,61,3,141,61,3,144,195
    ,238,1191                           :REM*195
510 DATA 62,3,173,62,3,201,250,208,185,169,
    85,162,1563                          :REM*91
520 DATA 201,32,174,197,56,96,169,254,133,1
    80,169,159,1820                     :REM*156
530 DATA 133,181,208,8,169,0,133,180,169,16
    0,133,181,1655                       :REM*30
540 DATA 165,43,133,170,165,44,133,171,160,
    0,177,170,1531                      :REM*102
550 DATA 141,63,3,200,177,170,141,64,3,96,1
    60,0,1218                           :REM*112
560 DATA 173,63,3,133,170,173,64,3,133,171,
    177,170,1433                        :REM*172
570 DATA 141,63,3,200,177,170,141,64,3,13,6
    3,3,1041                            :REM*230
580 DATA 208,2,56,96,24,96,160,2,177,180,14
    5,170,1316                          :REM*250
590 DATA 200,177,180,145,170,32,146,198,176
    ,12,165,180,1781                     :REM*34
600 DATA 105,4,133,180,144,232,230,181,208,
    228,96,56,1797                      :REM*252
610 DATA 165,45,229,43,141,67,3,165,46,229,
    44,141,1318                          :REM*96
620 DATA 68,3,56,169,255,237,67,3,133,164,1
    33,180,1468                          :REM*26
630 DATA 169,159,237,68,3,133,165,133,181,1
    65,43,133,1589                       :REM*88
640 DATA 166,165,44,133,167,169,96,141,14,2
    01,32,220,1548                       :REM*22
650 DATA 200,169,76,141,14,201,165,180,133,
    164,165,181,1789                    :REM*216
660 DATA 133,165,96,160,4,132,168,132,169,1
    77,164,145,1645                      :REM*82
670 DATA 170,136,16,249,164,168,177,164,208
    ,68,164,169,1853                     :REM*90
680 DATA 145,170,200,24,152,160,0,101,170,1
    45,170,170,1607                     :REM*194
690 DATA 165,171,105,0,200,145,170,134,170,
    133,171,164,1728                    :REM*246
700 DATA 168,200,152,24,101,164,133,164,169
    ,0,101,165,1541                     :REM*124
710 DATA 133,165,160,0,177,164,200,17,164,2
    08,188,145,1721                      :REM*74
720 DATA 170,136,16,251,24,169,2,101,170,13
    3,45,165,1382                         :REM*2
730 DATA 171,105,0,133,46,96,164,169,145,17
    0,230,168,1597                      :REM*122
740 DATA 230,169,164,168,201,137,240,12,201
    ,141,240,8,1911                     :REM*196
750 DATA 201,167,240,4,169,0,240,156,162,0,
    177,164,1680                         :REM*70
760 DATA 201,48,144,11,201,58,176,7,157,75,
    3,232,1313                           :REM*10
770 DATA 200,208,239,224,0,240,45,132,168,1
    42,69,3,1670                        :REM*105
780 DATA 177,164,201,44,240,2,169,0,141,125
    ,199,32,1494                         :REM*35
790 DATA 202,199,32,234,199,32,41,200,162,0
    ,164,169,1634                       :REM*103
800 DATA 189,85,3,240,6,145,170,200,232,208
    ,245,132,1855                       :REM*113
810 DATA 169,76,28,199,201,32,208,249,240,1
    98,169,0,1769                       :REM*131
820 DATA 174,69,3,157,75,3,169,75,133,122,1
    69,3,1152                           :REM*235
830 DATA 133,123,32,67,201,32,74,201,140,71
    ,3,141,1218                          :REM*29
840 DATA 72,3,32,60,201,96,32,60,201,169,0,
    133,1059                             :REM*11
850 DATA 180,169,160,133,181,173,72,3,160,3
    ,209,180,1623                       :REM*129
860 DATA 144,29,208,9,136,173,71,3,209,180,
    240,21,1423                           :REM*7
870 DATA 200,165,180,24,105,4,133,180,144,2
    ,230,181,1548                       :REM*227
880 DATA 177,180,136,17,180,208,218,56,96,1
    60,1,177,1606                       :REM*237
890 DATA 180,153,71,3,136,16,248,24,96,32,6
    7,201,1227                          :REM*225
900 DATA 172,71,3,173,72,3,133,98,132,99,16
    2,144,1262                          :REM*197
910 DATA 56,32,73,188,32,221,189,32,60,201,
    162,0,1246                          :REM*149
920 DATA 189,1,1,157,85,3,240,3,232,208,245
    ,142,1506                           :REM*109
930 DATA 70,3,96,164,168,152,72,24,101,170,
    133,164,1317                        :REM*175
940 DATA 133,166,165,171,105,0,133,165,133,
    167,56,165,1559                        :REM*3
950 DATA 45,229,166,141,67,3,165,46,229,167
    ,141,68,1467                        :REM*129
960 DATA 3,56,173,69,3,237,70,3,72,144,82,2
    08,1120                              :REM*83
```

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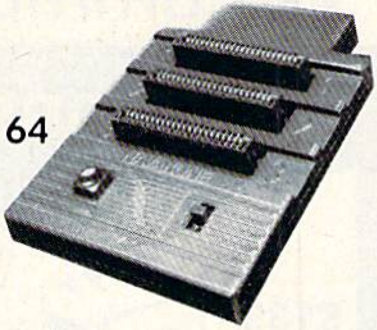

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Listing 1 continued.

```
970 DATA 29,104,141,65,3,104,56,237,65,3,72
    ,168,1047                            :REM*187
980 DATA 174,70,3,136,202,189,85,3,145,170,
    224,0,1401                           :REM*147
990 DATA 208,245,104,133,168,96,141,65,3,56
    ,165,164,1548                        :REM*237
1000 DATA 237,65,3,133,164,176,2,198,165,16
     0,0,174,1477                         :REM*99
1010 DATA 68,3,240,14,177,166,145,164,200,2
     08,249,230,1864                     :REM*111
1020 DATA 167,230,165,202,208,242,174,67,3,
     240,186,177,2061                     :REM*57
1030 DATA 166,145,164,200,202,208,248,240,1
     76,73,255,56,2133                     :REM*2
1040 DATA 101,164,133,164,144,2,230,165,173
     ,68,3,72,1419                       :REM*184
1050 DATA 24,101,165,133,165,104,24,101,167
     ,133,167,172,1456                    :REM*56
1060 DATA 67,3,240,9,136,177,166,145,164,19
     2,0,208,1507                         :REM*64
1070 DATA 247,174,68,3,240,16,198,167,198,1
     65,136,177,1789                     :REM*144
1080 DATA 166,145,164,192,0,208,247,202,208
     ,240,76,129,1977                     :REM*92
1090 DATA 200,173,69,3,205,70,3,208,1,96,16
     5,170,1363                          :REM*144
1100 DATA 164,171,32,55,165,24,165,34,105,2
     ,133,45,1095                         :REM*80
1110 DATA 165,35,105,0,133,46,160,0,177,170
     ,141,63,1195                         :REM*98
1120 DATA 3,200,177,170,141,64,3,96,165,1,4
     1,254,1315                           :REM*52
1130 DATA 133,1,96,165,1,9,1,133,1,96,32,12
     1,789                               :REM*250
1140 DATA 0,32,107,169,164,20,165,21,96,13,
     18,76,881                            :REM*40
1150 DATA 73,78,69,32,78,85,77,66,69,82,83,
     32,824                              :REM*224
1160 DATA 84,79,79,32,66,73,71,146,0,13,18,
     67,728                              :REM*200
1170 DATA 79,78,84,73,78,85,69,32,89,47,78,
     63,855                              :REM*244
1180 DATA 146,32,0,13,18,85,61,85,80,68,65,
     84,737                               :REM*32
1190 DATA 69,32,67,61,67,79,78,84,73,78,85,
     69,842                              :REM*192
1200 DATA 32,83,61,83,84,79,80,146,32,0,190
     ,197,1067                            :REM*72
1210 DATA 78,196,74,196,10,196,82,69,78,85,
     205,70,1339                         :REM*130
1220 DATA 73,78,196,67,72,65,78,71,197,82,6
     9,83,1131                            :REM*38
1230 DATA 69,212,0,0,0,0,0,0,0,0,0,0,281
                                         :REM*140
2000 SA=50176:BE=SA:L=10:NL=123            :REM*3
2010 PRINT"LOADING...":PRINT             :REM*215
2020 FORI=1TONL:CS=0                     :REM*121
2030 FORJ=0TO11:READK:IFK>255THEN3020
                                         :REM*171
2040 POKESA+J,K:CS=CS+K:NEXT             :REM*249
2050 READLT:IFLT<>CSTHEN3020              :REM*92
2060 SA=SA+12:L=L+10:NEXT                 :REM*46
2070 PRINTCHR$(17)SPC(9)"COMMODORE 64 BASIC
     AID"                                 :REM*22
2080 PRINTCHR$(17)SPC(12)"BY ROBIN FRANZEL"
                                          :REM*34
2090 PRINTCHR$(17)SPC(5)"ADDS RENUM, FIND,
     AND CHANGE"                          :REM*32
3000 PRINTCHR$(17)SPC(8)"TO YOUR BASIC COMM
     ANDS"                               :REM*159
3010 SYSBE:NEW                           :REM*157
3020 PRINT"ERROR IN DATA STATEMENT #";L
                                         :REM*255
```

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The Twelve Days of Christmas

By WILLIAM E. FORRESTER

Here's a musical program that will put you and your Commodore 64 into the spirit of the season.

I received quite a bit of mail from readers of *RUN* following the appearance of "A Commodore Christmas Carol" (*RUN*, Dec. 1984). Many readers wanted to know how to translate the Christmas music programs written for the VIC-20 to run on a Commodore 64. Unfortunately, direct translation is not possible, due to the complexity of the 64's SID chip. Controlling the SID chip by means of the 64's built-in Basic is, in fact, rather cumbersome.

By far the easiest way to write music for the 64 is to use a song-editor program, such as "SID Serenade" (*RUN*, Oct. 1984). Commercial software (e.g., Master Composer) can also be used for that purpose. Aside from the relative ease with which music can be written using such utilities, the music itself will be interrupt-driven, which means that it can play in the background while another program is running.

It is, of course, possible to write music programs in Basic that do the job quite well. The program presented here will enable you to hear "The Twelve Days of Christmas" on your 64.

The programming technique is essentially the same as that shown on p. 187 of the *Commodore 64 Programmer's Reference Guide.* The program contains two loops. The first (lines 100–260) reads the values contained in Data statements, converts those values into frequency and other information and puts the results into a two-dimensional array in memory. The second loop (lines 330–420) retrieves information from the array and produces sounds via the SID chip's three musical voices.

One trick that saves a lot of work when you're using this general method of programming is to include flags in your Data statements to mark the end of musical phrases. I used a value of 0 to mark the end of the various phrases in this program. These 0s are placed into the memory array when the Read loop is executed. Line 410 checks for the occurrence of these flags during the Play loop and sends control to line 720 when found. Lines 720–810 then serve to set the array pointer (AP) to the location where the next phrase begins.

Be careful when you type in the Data statements and any lines containing Pokes. One additional piece of advice is to deactivate any wedge that you might have loaded in prior to running the program. The wedge will otherwise have a very noticeable effect on the music's tempo. R

Address all author correspondence to William E. Forrester, R.D. 3, Box 174, Oswego, NY 13126.

RUN It Right

C-64; C-128 (in C-64 mode)

12 DRUMMERS DRUMMING
11 PIPERS PIPING
10 LORDS A-LEAPING
9 LADIES DANCING
8 MAIDS A-MILKING
7 SWANS A-SWIMMING
6 GEESE A-LAYING
5 GOLDEN RINGS
4 CALLING BIRDS
3 FRENCH HENS
2 TURTLE DOVES
A PARTRIDGE IN A PEAR TREE

Listing 1. *The Twelve Days of Christmas program.*

```
10 PRINT"{SHFT CLR}{3 CRSR DNs}{2 CRSR RTs}
   SETTING UP---"                     :REM*250
20 PRINT"{2 CRSR DNs}PLEASE WAIT 30 SECS."
                                      :REM*148
30 DIMFQ(11)                          :REM*148
40 FORI=0TO11:READFQ(I):NEXT          :REM*164
50 S=54272:FORL=0TO24:POKES+L,0:NEXT
                                      :REM*212
60 DIMH(2, 200),L(2, 200),C(2, 200):REM*214
70 V(0)=65:V(1)=65:V(2)=65            :REM*170
80 POKES+3,15 :POKES+10,8 :POKES+17,8
                                       :REM*32
90 POKES+22,128:POKES+23,244           :REM*14
100 FORK=0TO2                          :REM*58
110 AP=0                               :REM*40
120 READNM                            :REM*220
130 IFNM=-1THENH(K,AP)=0:L(K,AP)=0:C(K,AP)=
    0:GOTO260                          :REM*76
140 IFNM=0THENH(K,AP)=0:L(K,AP)=0:C(K,AP)=0
    :GOTO250                          :REM*168
150 WA=V(K):WB=WA-1:IFNM<0THENNM=-NM:WA=0:W
    B=0                               :REM*242
160 DR%=NM/128:OC%=(NM-128*DR%)/16   :REM*54
170 NT=NM-128*DR%-16*OC%              :REM*210
180 FR=FQ(NT)                          :REM*86
190 IFOC%=7THEN210                    :REM*216
200 FORJ=6TOOC%STEP-1:FR=FR/2:NEXT :REM*144
210 HF%=FR/256:LF%=FR-256*HF%         :REM*112
220 IFDR%=1THENH(K,AP)=HF%:L(K,AP)=LF%:C(K,
    AP)=WA:AP=AP+1:GOTO120              :REM*2
230 FORJ=1TODR%-1:H(K,AP)=HF%:L(K,AP)=LF%:C
    (K,AP)=WA:AP=AP+1:NEXT              :REM*6
240 H(K,AP)=HF%:L(K,AP)=LF%:C(K,AP)=WB
                                      :REM*148
250 AP=AP+1:GOTO120                   :REM*192
260 NEXT                               :REM*15
270 DU=20                              :REM*73
280 FORK=0TO2:H(K,0)=0:L(K,0)=0:NEXT:REM*31
290 POKES+5,9:POKES+6,0                :REM*23
300 POKES+12,9:POKES+13,0              :REM*31
310 POKES+19,9:POKES+20,0              :REM*75
320 POKES+24,31                       :REM*227
330 AP=0:J=1                          :REM*205
340 PRINT"{SHFT CLR}{CTRL 1}{6 CRSR DNs}";:
    CO=J:POKE53280,CO:POKE53281,CO+17
                                      :REM*107
350 ONJGOSUB540,530,520,510,500,490,480,470
    ,460,450,440,430                  :REM*117
360 POKES,L(0,AP):POKES+7,L(1,AP):POKES+14,
    L(2,AP)                           :REM*151
370 POKES+1,H(0,AP):POKES+8,H(1,AP):POKES+1
    5,H(2,AP)                         :REM*199
380 POKES+4,C(0,AP):POKES+11,C(1,AP):POKES+
    18,C(2,AP)                         :REM*91
390 FORT=1TODU :NEXT                  :REM*161
400 AP=AP+1                             :REM*9
410 IFC(0,AP)=0THEN720                  :REM*9
420 GOTO360                           :REM*207
430 PRINT"{10 CRSR RTs}12 DRUMMERS DRUMMING
    "                                  :REM*45
440 PRINT"{12 CRSR RTs}11 PIPERS PIPING"
                                      :REM*215
450 PRINT"{11 CRSR RTs}10 LORDS A-LEAPING"
                                       :REM*91
460 PRINT"{12 CRSR RTs}9 LADIES DANCING"
                                      :REM*137
470 PRINT"{12 CRSR RTs}8 MAIDS A-MILKING"
                                      :REM*163
480 PRINT"{11 CRSR RTs}7 SWANS A-SWIMMING"
                                      :REM*215
490 PRINT"{12 CRSR RTs}6 GEESE A-LAYING"
                                      :REM*127
500 PRINT"{13 CRSR RTs}5 GOLDEN RINGS"
                                        :REM*1
510 PRINT"{13 CRSR RTs}4 CALLING BIRDS"
                                       :REM*99
520 PRINT"{14 CRSR RTs}3 FRENCH HENS"
                                      :REM*182
530 PRINT"{13 CRSR RTs}2 TURTLE DOVES"
                                       :REM*94
540 PRINT"{7 CRSR RTs}A PARTRIDGE IN A PEAR
    TREE"                             :REM*216
550 RETURN                             :REM*98
560 DATA 34334,36376,38539,40830    :REM*138
570 DATA 43258,45830,48556,51443    :REM*234
580 DATA 54502,57743,61176,64814    :REM*122
590 DATA 128,320,320,576,325,325,581,324,32
    5,327,329,330,327,329,327,329,330,0
                                      :REM*178
600 DATA 592,327,329,586,0,592,327,329,330,
    327,0                              :REM*52
610 DATA 1104,210,971,2128,336,330,329,327,
    581,586,578,581,327,325,324,322,576
                                       :REM*38
620 DATA 329,330,592,338,330,329,325,583,16
    05,-1                             :REM*216
630 DATA 128,-512,313,314,320,-256,320,322,
    320,-256,580,580,581,576,0         :REM*72
640 DATA 581,1092,0,581,1092,0         :REM*22
650 DATA 1093,1093,1093,1092,329,327,325,32
    0,569,314,320,314,320,570,324,322
                                       :REM*32
660 DATA 320,311,564,576               :REM*48
670 DATA 581,1093,580,1593,-1         :REM*194
680 DATA 128,-512,309,311,313,-256,313,314,
    320,-256,320,-256,304,-256,309,308
                                      :REM*234
690 DATA 565,0,313,314,576,560,0,313,314,57
    6,560,0                           :REM*220
700 DATA 1081,1080,1079,1072,1573,311,313,3
    14,313,567,1584,565               :REM*190
710 DATA 569,570,576,560,1589,-1     :REM*164
720 IFAP=37THENIFJ>5THENAP=51:Q=1:GOTO360
                                      :REM*216
730 IFAP=37THENIFJ=5THENAP=64:GOTO360
                                      :REM*124
740 IFAP=37THENIFJ>1THENAP=38 :Z=1:GOTO360
                                       :REM*84
750 IFAP=37THENAP=136:GOTO360          :REM*94
760 IFAP=50ANDZ=J-1THENAP=132:GOTO360
                                      :REM*240
770 IFAP=50 THENZ=Z+1:AP=38:GOTO360 :REM*39
780 IFAP=63ANDQ=J-5THENAP=AP+1:GOTO360
                                      :REM*227
790 IFAP=63 THENQ=Q+1:AP=51:GOTO360:REM*115
800 IFAP=164ANDJ=12THENPOKES+24,0:END
                                       :REM*45
810 IFAP=164THENAP=1:J=J+1:GOTO340 :REM*161
```

Stack

Moving a few bars from one pile to another sounds easy, until you try this game.

By GLENN W. ZUCH

This game of mental skill and logic is based on the popular Towers of Hanoi game. The object of this computer version is to move several bars from one pile to another pile, using a third pile as an intermediary. In moving them, you cannot place a longer bar on top of a shorter one. It sounds simple enough, but there are distinct rules you must follow if you expect to receive a reward for stacking the bars in the fewest possible number of moves.

You will find that this is a very user-friendly game. Everything you are required to do is clearly indicated on the screen. Every mistake you make brings up a prompt to remind you how to get back on the right track. If you follow the directions, none of your errors will count against your final score. You can even become a winner in more than one way.

Finally, you can choose from any one of four levels of difficulty, moving from the easiest to the most difficult as your skill improves.

Playing the Game

When you run this game, you are first greeted by a title in large block letters and an illustration of the beginning stack of bars, each with its own identifying number. This is followed by some simple directions.

You are then given the option of choosing to move from two to five bars. The fewer bars, the easier it will be to solve the game. After you make your choice, the computer will display the starting setup, based on your choice, and tell you which bars you will be moving.

You are then asked which bar you want to move and where you want to move it. You move one bar at a time.

While the computer gives you directions and prompts you when you try to make incorrect entries, you must still make all of the decisions and computations to win. This, as you will soon discover, is not always an easy task.

Eventually, you will succeed in stacking all the bars in the right-most pile. The program will acknowledge if you are able to do this in the fewest possible number of moves. Even if it took you more than the minimum number of moves, you are still a winner! The computer will tell you how many moves you took and the least number of moves required, so that you will have a target to shoot for the next time you play. R

Address all author correspondence to Glenn W. Zuch, 183 Hagen Ave., N. Tonawanda, NY 14120.

Listing 1. *The Stack game program.*

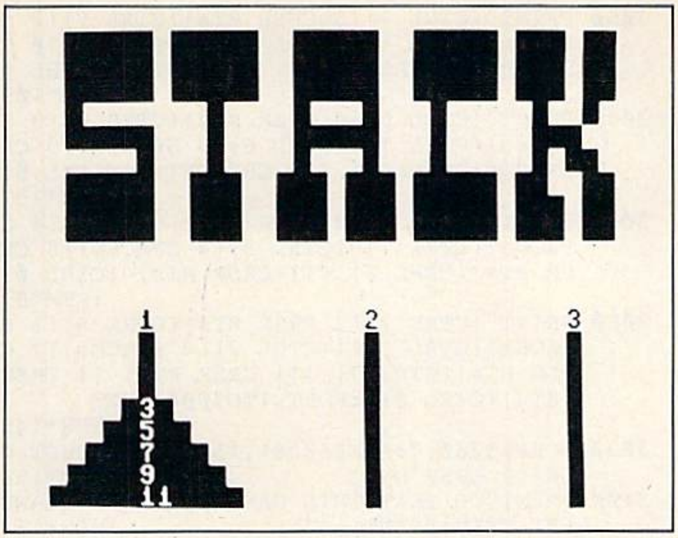
```
100 REM*****STACK*****                 :REM*176
110 GOSUB2000                           :REM*76
120 DIMG(10,4)                          :REM*28
130 FORB=1TO5:FORL=1TO3:G(B,L)=0:NEXTL:NEXT
    B                                  :REM*174
140 PRINT"{2 CRSR DNs}{3 CRSR RTs}HOW MANY
    BARS DO YOU WANT TO MOVE           :REM*108
```

```
150 PRINT"{12 CRSR RTs}(2,3,4 OR 5)?
                                       :REM*204
160 INPUT X                            :REM*120
170 D=0                                 :REM*86
180 FORZ=1TO5:IFZ=XTHEN300:NEXTZ       :REM*210
300 POKE53281,5:PRINT"{SHFT CLR}{CRSR DN}
                                       :REM*119
310 PRINT"{7 CRSR RTs}{CTRL 7}{CTRL 9} {CTR
    L 0}                               :REM*137
320 PRINT"{6 CRSR RTs}{CTRL 2}{CTRL 9} 3 {C
    TRL 0}                             :REM*187
```

→

RUN It Right

C-64; C-128 (in C-64 mode)



Listing 1 continued.

```
330 PRINT"{5 CRSR RTs}{CTRL 2}{CTRL 9}{2 SP
    ACEs}5{2 SPACEs}{CTRL 0}            :REM*211
340 PRINT"{4 CRSR RTs}{CTRL 2}{CTRL 9}{3 SP
    ACEs}7{3 SPACEs}{CTRL 0}            :REM*11
350 PRINT"{3 CRSR RTs}{CTRL 2}{CTRL 9}{4 SP
    ACEs}9{4 SPACEs}{CTRL 0}            :REM*215
360 PRINT"{2 CRSR RTs}{CTRL 2}{CTRL 9}{5 SP
    ACEs}11{4 SPACEs}{CTRL 0}{2 CRSR DNs}
                                        :REM*177
370 PRINT"{CTRL 2}{7 CRSR RTs}1{10 CRSR RTs
    }2{10 CRSR RTs}3{CTRL 1}            :REM*43
400 N=5:B=11                            :REM*123
410 FORC=XTO1STEP-1                     :REM*123
420 G(N,1)=B:B=B-2:N=N-1:NEXTC:GOSUB1230
                                        :REM*199
430 IFX=2THENMM$="9 & 11"               :REM*97
440 IFX=3THENMM$="7,9 & 11"             :REM*107
450 IFX=4THENMM$="5,7,9 & 11"           :REM*251
460 IFX=5THENMM$="3,5,7,9 & 11"         :REM*145
470 PRINT"{CRSR DN}{CTRL 1}YOU WILL BE MOVI
    NG BARS ";MM$                       :REM*57
480 PRINT"{CTRL 7}":INPUT"WHICH BAR DO YOU
    WANT TO MOVE";B                     :REM*85
490 IFB=3ANDX=<4THEN530                 :REM*195
500 IFB=5ANDX=<3THEN530                  :REM*9
510 IFB=7ANDX=<2THEN530                 :REM*79
520 IF(B-3)*(B-5)*(B-7)*(B-9)*(B-11)=0THEN5
    40                                  :REM*250
530 PRINT"{CTRL 2}YOU MAY ONLY USE ";MM$;""
    :PRINT SPC(10)"ENTER AGAIN!{CTRL 7}":GO
    TO480                               :REM*242
540 FORY=1TO5:FORR=1TO3:IFG(Y,R)=BTHEN560
                                        :REM*4
550 NEXTR:NEXTY                         :REM*14
560 FORZ=YTO1STEP-1                     :REM*234
570 IFG(Z,R)=0THEN590                   :REM*190
580 IFG(Z,R)<BTHEN600                   :REM*2
590 NEXTZ:GOTO700                       :REM*24
600 PRINT"{CTRL 2}{3 CRSR RTs}THAT BAR IS U
    NDER ANOTHER ONE. MAKE{5 CRSR RTs}ANOTH
    ER CHOICE.":PRINT"{CTRL 7}          :REM*124
610 GOTO480                             :REM*182
700 INPUT"PLACE BAR ON WHICH STACK";L
                                        :REM*46
710 IF(L-1)*(L-2)*(L-3)=0THEN800        :REM*234
720 PRINT"{CTRL 2}YOU MUST CHOOSE '1', '2'
    OR '3'{CTRL 7}":GOTO700             :REM*186
800 FORY=1TO5:IFG(Y,L)<>0THEN830        :REM*139
810 NEXTY                                :REM*1
820 GOTO860                             :REM*137
```

```
830 IFB<G(Y,L)THEN860                   :REM*87
840 PRINT"{CTRL 2}YOU CAN'T PLACE A LONGER
    BAR ON TOP OF ASMALLER ONE...TRY AGAIN!
                                        :REM*9
850 PRINT"{CTRL 7}":GOTO480             :REM*185
860 FORW=1TO5:FORC=1TO3:IFG(W,C)=BTHEN910
                                        :REM*239
900 NEXTC:NEXTW                         :REM*117
910 FORV=1TO5:IFG(V,L)<>0THEN940        :REM*225
920 NEXTV                               :REM*87
930 V=5:GOTO950                         :REM*197
940 V=V-1                               :REM*199
950 G(V,L)=G(W,C):G(W,C)=0:GOSUB1230:REM*53
960 D=D+1                               :REM*81
970 FORY=1TO5:FORR=1TO2:IFG(Y,R)<>0THEN480
                                        :REM*179
980 NEXTR:NEXTY                         :REM*189
990 IFD<>2{UP ARROW}X-1THEN1500         :REM*23
1000 GOSUB3190                          :REM*3
1200 POKE53281,13:PRINT"{SHFT CLR}{CTRL 1}{
     8 CRSR DNs}{8 CRSR RTs}TRY AGAIN{SHFT
     SPACE}('Y' OR 'N')";:INPUT A$ :REM*194
1210 IF A$="N" THEN 1330                :REM*72
1220 IFA$="Y" THEN 130                  :REM*160
1230 FORJ=1TO5:P=7:FORS=1TO3            :REM*232
1240 IFG(J,S)=0THEN1300                 :REM*242
1250 PRINTTAB(P-INT(G(J,S)/2));         :REM*214
1260 FORW=1TOG(J,S)                     :REM*104
1270 PRINT"{CTRL 4}{CTRL 9} {CTRL 0}";
                                        :REM*152
1280 NEXTW                              :REM*201
1290 GOTO1310                           :REM*37
1300 PRINTTAB(P);"{CTRL 7}{CTRL 9} {CTRL 0}
     ";                                 :REM*139
1310 P=P+11                             :REM*59
1320 NEXTS:PRINT:NEXTJ:RETURN           :REM*113
1330 POKE53280,4:POKE53281,7:PRINT"{SHFT CL
     R}{3 CRSR DNs}                     :REM*47
1340 PRINT"{3 CRSR RTs}THANK YOU...PLEASE P
     LAY AGAIN SOON.":FORT=1TO3000:NEXT:PRI
     NT"{SHFT CLR}                      :REM*157
1350 END                                :REM*77
1500 POKE53280,0:POKE53281,8:PRINT"{SHFT CL
     R}{3 CRSR DNs}                     :REM*213
1510 IFX=2THENM$="3 MOVES"              :REM*169
1520 IFX=3THENM$="7 MOVES"              :REM*243
1530 IFX=4THENM$="15 MOVES"             :REM*97
1540 IFX=5THENM$="31 MOVES"             :REM*92
1550 PRINT"{CTRL 2}{9 CRSR RTs}IT TOOK YOU"
     ;D;"MOVES.{3 CRSR DNs}             :REM*230
1560 PRINT"IT COULD HAVE BEEN DONE IN ONLY
     ";M$;"                             :REM*6
1570 PRINT"{3 CRSR DNs}{8 CRSR RTs}TRY HARD
     ER NEXT TIME!":FORT=1TO5000:NEXT:GOTO1
     200                                :REM*170
2000 POKE53280,8:POKE53281,3:PRINT"{SHFT CL
     R}{4 CRSR DNs}{CTRL 3}             :REM*235
2010 PRINT"{CTRL 9}{3 CRSR RTs}{5 SPACEs}{C
     RSR RT}{5 SPACEs}{2 CRSR RTs}{5 SPACEs
     }{2 CRSR RTs}{5 SPACEs}{CRSR RT}{3 SPA
     CEs}{CRSR RT}{2 SPACEs}{CRSR RT}
                                        :REM*221
2020 PRINT"{CTRL 9}{3 CRSR RTs}{5 SPACEs}{C
     RSR RT}{5 SPACEs}{2 CRSR RTs}{5 SPACEs
     }{2 CRSR RTs}{5 SPACEs}{CRSR RT}{3 SPA
     CEs}{CRSR RT}{2 SPACEs}{CRSR RT}
                                        :REM*231
2030 PRINT"{CTRL 9}{3 CRSR RTs}{5 SPACEs}{C
     RSR RT}{5 SPACEs}{2 CRSR RTs}{5 SPACEs
     }{2 CRSR RTs}{5 SPACEs}{CRSR RT}{3 SPA
     CEs}{CRSR RT}{2 SPACEs}{CRSR RT}
                                        :REM*241
2040 PRINT"{CTRL 9}{3 CRSR RTs} {7 CRSR RTs
     } {4 CRSR RTs} {3 CRSR RTs} {3 CRSR RT
     s} {5 CRSR RTs} {2 CRSR RTs} {CRSR RT}
                                        :REM*183
```

→

Listing 1 continued.

```
2050 PRINT"{CTRL 9}{3 CRSR RTs}{5 SPACEs}{3
      CRSR RTs} {4 CRSR RTs}{5 SPACEs}{3 CR
     SR RTs} {5 CRSR RTs}{3 SPACEs}{CRSR RT
     }                              :REM*164
2060 PRINT"{CTRL 9}{7 CRSR RTs} {3 CRSR RTs
     } {4 CRSR RTs} {3 CRSR RTs} {3 CRSR RT
     s} {5 CRSR RTs} {CRSR RT}{2 SPACEs}{CR
     SR RT}                          :REM*90
2070 PRINT"{CTRL 9}{3 CRSR RTs}{5 SPACEs}{2
      CRSR RTs}{3 SPACEs}{2 CRSR RTs}{3 SPA
     CEs}{CRSR RT}{3 SPACEs}{CRSR RT}{5 SPA
     CEs}{CRSR RT}{2 SPACEs}{2 CRSR RTs}{2
     SPACEs}{CRSR RT}               :REM*216
2080 PRINT"{CTRL 9}{3 CRSR RTs}{5 SPACEs}{2
      CRSR RTs}{3 SPACEs}{2 CRSR RTs}{3 SPA
     CEs}{CRSR RT}{3 SPACEs}{CRSR RT}{5 SPA
     CEs}{CRSR RT}{3 SPACEs}{CRSR RT}{2 SPA
     CEs}{CRSR RT}                   :REM*18
2090 PRINT"{CTRL 9}{3 CRSR RTs}{5 SPACEs}{2
      CRSR RTs}{3 SPACEs}{2 CRSR RTs}{3 SPA
     CEs}{CRSR RT}{3 SPACEs}{CRSR RT}{5 SPA
     CEs}{CRSR RT}{3 SPACEs}{CRSR RT}{2 SPA
     CEs}{CRSR RT}":PRINT"{2 CRSR DNs}{CTRL
      7}":FORT=1TO1500:NEXT         :REM*206
3000 PRINT"{CTRL 1}{7 CRSR RTs}1{12 CRSR RT
     s}2{11 CRSR RTs}3{CTRL 7}      :REM*223
3010 PRINT"{7 CRSR RTs}{CTRL 9} {12 CRSR RT
     s} {11 CRSR RTs} {CTRL 0}      :REM*157
3020 PRINT"{7 CRSR RTs}{CTRL 9} {12 CRSR RT
     s} {11 CRSR RTs} {CTRL 0}      :REM*167
3030 PRINT"{7 CRSR RTs}{CTRL 9} {12 CRSR RT
     s} {11 CRSR RTs} {CTRL 0}      :REM*177
3040 PRINT"{CTRL 8}{6 CRSR RTs}{CTRL 9} {CT
     RL 1}3{CTRL 8} {11 CRSR RTs}{CTRL 7} {
     11 CRSR RTs} {CTRL 0}          :REM*125
3050 PRINT"{CTRL 1}{5 CRSR RTs}{CTRL 9}{2 S
     PACEs}{CTRL 1}5{CTRL 1}{2 SPACEs}{10 C
     RSR RTs}{CTRL 7} {11 CRSR RTs} {CTRL 0
     }                              :REM*109
3060 PRINT"{CTRL 6}{4 CRSR RTs}{CTRL 9}{3 S
     PACEs}{CTRL 1}7{CTRL 6}{3 SPACEs}{9 CR
     SR RTs}{CTRL 7} {11 CRSR RTs} {CTRL 0}
                                    :REM*197
3070 PRINT"{CTRL 3}{3 CRSR RTs}{CTRL 9}{4 S
     PACEs}{CTRL 1}9{CTRL 3}{4 SPACEs}{8 CR
     SR RTs}{CTRL 7} {11 CRSR RTs} {CTRL 0}
                                     :REM*87
3080 PRINT"{CTRL 2}{2 CRSR RTs}{CTRL 9}{5 S
     PACEs}{CTRL 1}11{CTRL 2}{4 SPACEs}{7 C
     RSR RTs}{CTRL 7} {11 CRSR RTs} {4 CRSR
      RTs}{CTRL 0}":FORT=1TO3000:NEXT
                                    :REM*148
3090 POKE53280,7:POKE53281,15:PRINT"{SHFT C
     LR}{5 CRSR DNs}                :REM*154
3100 PRINT"TO PLAY THIS GAME YOU MUST TRANS
     FER THE":PRINT                 :REM*154
3110 PRINT"BARS FROM THE {CTRL 9}LEFT{CTRL
     0} STACK TO THE {CTRL 9}RIGHT{CTRL 0}"
     :PRINT                         :REM*226
3120 PRINT"STACK, ONE BAR AT A TIME, NEVER
     PUTTING":PRINT                  :REM*32
3130 PRINT"A LONGER BAR ON A SMALLER ONE.":
     PRINT"{3 CRSR DNs}             :REM*122
3140 PRINT"{6 CRSR RTs}PRESS {CTRL 9}<RETUR
     N>{CTRL 0} TO CONTINUE          :REM*14
3150 PRINT"{COMD 8}":INPUT C        :REM*100
3160 POKE53280,2:POKE53281,7:PRINT"{SHFT CL
     R}{5 CRSR DNs}{CTRL 1}          :REM*46
3170 PRINT"{4 CRSR RTs}YOU MAY CHOOSE FROM
     2 TO 5 BARS":PRINT              :REM*86
3180 PRINT"{7 CRSR RTs}WHEN YOU START THE G
     AME.{5 CRSR DNs}":FORT=1 TO 1500:NEXT:
     RETURN                         :REM*180
3190 POKE53280,7:POKE53281,14:PRINT"{SHFT C
     LR}{4 CRSR DNs}{CTRL 2}         :REM*52
3200 PRINT"{2 CRSR RTs}XXXX{3 CRSR RTs}X{4
     CRSR RTs}X{2 CRSR RTs}XXXXX{3 CRSR RTs
     }XXXXXX{2 CRSR RTs}XXXXX       :REM*148
3210 PRINT"{CRSR RT}X{4 CRSR RTs}X{2 CRSR R
     Ts}X{4 CRSR RTs}X{2 CRSR RTs}X{4 CRSR
     RTs}X{2 CRSR RTs}X{7 CRSR RTs}X{4 CRSR
      RTs}X                         :REM*230
3220 PRINT"{CRSR RT}X{7 CRSR RTs}X{4 CRSR R
     Ts}X{2 CRSR RTs}X{4 CRSR RTs}X{2 CRSR
     RTs}X{7 CRSR RTs}X{4 CRSR RTs}X :REM*2
3230 PRINT"{CRSR RT}X{7 CRSR RTs}X{4 CRSR R
     Ts}X{2 CRSR RTs}X{4 CRSR RTs}X{2 CRSR
     RTs}X{7 CRSR RTs}X{4 CRSR RTs}X:REM*12
3240 PRINT"{2 CRSR RTs}XXXX{3 CRSR RTs}X{4
     CRSR RTs}X{2 CRSR RTs}XXXXX{3 CRSR RTs
     }XXXXX{3 CRSR RTs}XXXXX        :REM*206
3250 PRINT"{6 CRSR RTs}X{2 CRSR RTs}X{4 CRS
     R RTs}X{2 CRSR RTs}X{7 CRSR RTs}X{7 CR
     SR RTs}X{CRSR RT}X             :REM*156
3260 PRINT"{6 CRSR RTs}X{2 CRSR RTs}X{4 CRS
     R RTs}X{2 CRSR RTs}X{7 CRSR RTs}X{7 CR
     SR RTs}X{2 CRSR RTs}X           :REM*96
3270 PRINT"{CRSR RT}X{4 CRSR RTs}X{2 CRSR R
     Ts}X{4 CRSR RTs}X{2 CRSR RTs}X{7 CRSR
     RTs}X{7 CRSR RTs}X{3 CRSR RTs}X:REM*72
3280 PRINT"{2 CRSR RTs}XXXX{4 CRSR RTs}XXXX
     {3 CRSR RTs}X{7 CRSR RTs}XXXXXX{2 CRSR
      RTs}X{4 CRSR RTs}X{5 CRSR DNs}:REM*92
3290 PRINT"{4 CRSR RTs}YOU DID IT IN THE LE
     AST POSSIBLE{CRSR DN}          :REM*104
3300 PRINT"{9 CRSR RTs}NUMBER OF MOVES!!!!!
     ":FORT=1TO2500:NEXT:RETURN     :REM*120
```

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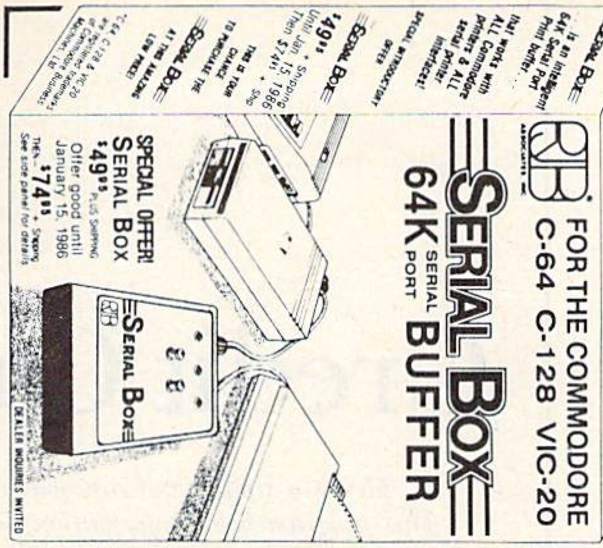
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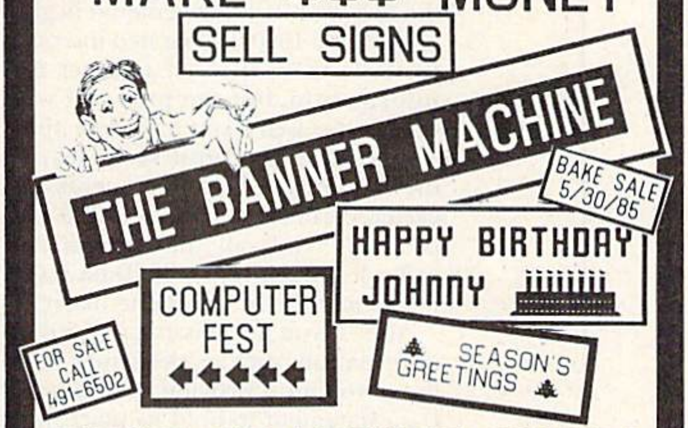
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Credit Card Keeper

Here's a simple and easy way to keep track of all your credit cards. This program holds information on an unlimited number of cards in three general categories and alphabetically sorts all the information before showing it to you. What could be easier?

By MICHAEL REICH

Credit Card File uses Data statements to hold five pieces of information on each credit card: category, name of card, account number, expiration date and address of issuer.

The program is set up for three categories of credit cards: Gasoline, Stores and Other. You may change these categories to meet your particular needs. For each record (account), the five data items are entered beginning at line 1000. I separated the categories to make it easier to enter the information, but the program will work just as well if you mix them up.

One thing you must keep clear is the *order* of the Data statements for each record. From lines 300–370, the program reads all the data in the order listed above, so the Data statements *must* be in that same order.

Also, if you are missing a piece of information, such as the issuer's address, you must provide a temporary Data statement to hold its place; just create a Data statement with blank spaces. The last Data statement must be the word END, or you'll get an Out of Data error.

I allowed up to 18 letters for each card name, up to 19 characters for the account number, up to five characters for the expiration date (this usually consists of just the month and year—03/84, for example) and up to 39 characters, in two lines, for the issuer's address. You may change the size of these entries, but I suggest you keep the card names the same length, the account numbers the same, and so on.

How the Program Works

After the program gives you the option of seeing the general instructions that are available, the program moves to the Read routine, which begins at line 300. The first Read statement (line 320) checks the type (TY$) of the next record. If TY$ = END, the last record has been read and the program jumps to a sort routine at line 4000.

If TY$ does not equal END, the program executes five more Read commands in line 330. This line picks up the five information items mentioned above and concatenates them into a two-dimensional array (EN$ [X,Y]) that corresponds to the record type picked up earlier in the Read statement in line 320.

Depending on the value of TY$, lines 340–360 determine which array element will receive the new information. These lines also keep track of the number of records for each category; these figures become very useful later.

Once all the data is read and filed away in the appropriate array location, the program jumps to the sorting routine that begins at line 4000. This is a simple "bubble" sort to al-

RUN It Right

C-64; C-128 (in C-64 mode); Datassette phabetize the records in each category. Following the sort, the program moves to the two menus, which begin at line 5000.

Menu Selections

The first menu offers choices of reviewing the files, updating the data or quitting (selecting the Update option simply lists the program beginning at line 1000). Whenever you add or change Data statements, remember to resave the program.

The second menu provides a variety of ways to view the files. You can look at each category separately or at the combined records for all categories. Whichever you choose, the program will show you the name, number, expiration date and address for each record, one record at a time.

Command Line

During the display of the records, a command line will be displayed at the bottom of the screen. This line shows how to move through the lists of credit cards by pressing one of three keys: N for the next record in the category you selected; P for the prior record; and M to return to the menu.

When you press either N or P, the program checks the array values for category size, obtained in lines 340–360, to see if you have either reached the end or are back at the beginning of the selected category. In either case, the appropriate message is displayed and the program waits for your next move. Pressing M at any time returns you to the menu.

Well, that's the way Credit Card File works. If you don't want to type in the program, I will provide you with a copy if you send me a blank tape or formatted disk along with a self-addressed stamped mailer and $3.

Address all author correspondence to Michael Reich, 754 Rockborough Drive, Stone Mountain, GA 30083.

Listing 1. *Credit Card File program.*

```
5 REM MOD.CREDIT CARD                    :REM*251
50 POKE53280,15:POKE53281,15:PRINTCHR$(14)"
   {SHFT CLR}"                          :REM*142
100 FI$="{SHFT C}REDIT {SHFT C}ARD {SHFT F}
    ILE":L=12                            :REM*56
110 M$(1)=" {CTRL 2} {COMD 5}{SHFT N}{CTRL
    2}EXT{9 SPACEs}{COMD 5}{SHFT P}{CTRL 2}
    REVIOUS{9 SPACEs}{COMD 5}{SHFT M}{CTRL
    2}ENU {CTRL 2}"                     :REM*174
115 M$(2)="{COMD 5}{5 SPACEs}{COMD T}{12 SP
    ACEs}{COMD T}{16 SPACEs}{COMD T}{CTRL 2
    }"                                  :REM*209
120 S=25:DIM CN$(S),NO$(S),ED$(S),TY$(S)
                                        :REM*202
130 M$(3)="{CTRL 9}{CTRL 2}{SHFT T}HERE ARE
     NO {SHFT P}{SHFT R}{SHFT I}{SHFT O}{SH
    FT R} {SHFT E}NTRIES FOR {SHFT C}ATEGOR
    Y"                                  :REM*210
140 M$(4)="{CTRL 9}{CTRL 2}{SHFT T}HERE ARE
     NO {SHFT M}{SHFT O}{SHFT R}{SHFT E} {S
    HFT E}NTRIES FOR {SHFT C}ATEGORY"
                                        :REM*156
150 CL$="{40 SPACEs}"                    :REM*56
170 PRINT"{3 CRSR DNs}{5 CRSR RTs}{CTRL 2}"
    FI$"{3 CRSR DNs}BY {SHFT M}ICHAEL {SHFT
     R}EICH"                            :REM*142
175 PRINT"{COMD 5}{2 CRSR DNs}{SHFT I}NSTRU
    CTIONS? [Y/N]"                      :REM*107
180 GETA$:IFA$=""THEN180                 :REM*58
185 IFA$="{SHFT Y}"ORA$="Y"THENGOSUB6000
                                        :REM*169
190 GOTO300                             :REM*136
200 REM{4 SPACEs}SCREEN LOCATER & PAGE HEAD
    ER                                  :REM*216
202 REM{2 SPACEs}* * * * * * * * * * * * *
    * * *                                 :REM*8
210 PRINT"{HOME}";                      :REM*142
220 IFY<>0THENPOKE214,Y-1:PRINT         :REM*102
230 POKE211,X:RETURN                    :REM*160
240 REM                                  :REM*46
250 PRINT"{SHFT CLR}":X=L:Y=1:GOSUB200:PRIN
    TFI$:X=15:Y=3:GOSUB200:PRINT"{CTRL 9}{C
    TRL 2}{SHFT M}ENU"                  :REM*226
260 RETURN                               :REM*63
300 REM{11 SPACEs}READ FILE             :REM*167
302 REM{2 SPACEs}* * * * * * * * * * * * *
    * * *                               :REM*109
320 READTY$:IFTY$="END"THEN390           :REM*39
330 READCN$,NO$,ED$,A1$,A2$             :REM*225
340 IFTY$="{SHFT G}"THENEN$(0,G)=CN$+NO$+ED
    $+A1$+A2$:G=G+1                     :REM*253
350 IFTY$="{SHFT S}"THENEN$(1,SS)=CN$+NO$+E
    D$+A1$+A2$:SS=SS+1                  :REM*217
360 IFTY$="{SHFT O}"THENEN$(2,O)=CN$+NO$+ED
    $+A1$+A2$:O=O+1                      :REM*83
370 GOTO320                              :REM*93
380 REM                                 :REM*187
390 GOTO4000                            :REM*101
400 REM{15 SPACEs}PRINT FILE            :REM*147
402 REM{2 SPACEs}* * * * * * * * * * * * *
    * * *                               :REM*209
410 PRINT"{SHFT CLR}":REM PRINT PAGE HEADER
                                         :REM*45
420 FORM=X1TOX2:FORN=0TOY1              :REM*239
430 CN$=LEFT$(EN$(M,N),18):NO$=MID$(EN$(M,N
    ),19,19):ED$=MID$(EN$(M,N),38,5)
                                        :REM*207
435 A1$=MID$(EN$(M,N),43,20):A2$=RIGHT$(EN$
    (M,N),8)                            :REM*124
440 PRINT"{HOME}{5 CRSR DNs}":IFCN$=""THEN5
    60                                  :REM*135
450 PRINT"{CTRL 9}{COMD 5}{SHFT C}ARD {SHFT
     N}AME:{3 SPACEs}{CTRL 0}{CTRL 2} "CN$:
    PRINT                                :REM*59
460 PRINT"{CTRL 9}{COMD 5}{SHFT C}ARD {SHFT
     N}UMBER: {CTRL 0}{CTRL 2} "NO$:PRINT
                                         :REM*55
470 PRINT"{CTRL 9}{COMD 5}{SHFT E}XP. {SHFT
     D}ATE:{3 SPACEs}{CTRL 0}{CTRL 2} "ED$:
    PRINT                               :REM*181
475 PRINT"{CTRL 9}{COMD 5}{SHFT A}DDRESS:{5
     SPACEs}{CTRL 0}{CTRL 2} "A1$:PRINTTAB(
    15)A2$                              :REM*224
480 X=0:Y=22:GOSUB200:PRINTM$(1)+M$(2)
                                         :REM*41
490 K=0:GETA$:IFA$=""THEN490            :REM*123
495 A=ASC(A$)                           :REM*138
500 IFA=77ORA=205 THENGOSUB250:RETURN
                                         :REM*15
503 IFA$="{SHFT P}"ORA$="P"THENIFC=1THEN565
                                          :REM*6
504 IFA$="{SHFT P}"ORA$="P"THENN=N-2:IFN>=-
    1THEN560                             :REM*75
505 IFC>1THENIFN<0THENX= 0:Y=15:GOSUB200:PR
    INTM$(3):FORK=0TO2000:NEXT          :REM*252
510 IFKTHENX=0:Y=15:GOSUB200:PRINTCL$:N=N+2
    :GOTO490                             :REM*27
530 IFA$<>"{SHFT N}"ANDA$<>"N"THEN490
                                        :REM*254
535 IFC=1THENIFN+1>=Y1THEN570            :REM*53
540 IFN+1>=Y1THENX=0:Y=15:GOSUB200:PRINTM$(
    4):FORK=0TO2000:NEXT                :REM*212
550 IFKTHENX=0:Y=15:GOSUB200:PRINTCL$:GOTO4
    90                                  :REM*214
560 IFC<>1THEN NEXTN                     :REM*42
```

→

Listing 1 continued.

```
565 IFC=1THENIF(A$="{SHFT P}"ORA$="P")THENI
    F(N>0 ANDN<=G)THENN=N-1:GOTO430:REM*181
567 IFC=1THENIF(A$="{SHFT P}"ORA$="P")THENI
    FN=0THENM=M-1:N=G:IFM>=0THEN430:REM*217
568 IFC=1THENIFM<0THENX=0:Y=15:GOSUB200:PRI
    NTM$(3):FORK=0TO2500:NEXT          :REM*206
569 IFKTHENX=0:Y=15:GOSUB200:PRINTCL$:GOSUB
    250:RETURN                         :REM*79
570 IFC=1THENIFN<GTHENNEXTN            :REM*138
572 IFC=1THENIFM<>X2THEN NEXTM         :REM*36
575 IFC=1THENIFM=X2THENX=0:Y=15:GOSUB200:PR
    INTM$(4):FORK=0TO2000:NEXT:GOTO550
                                       :REM*47
580 GOTO490                            :REM*168
1000 REM{14 SPACEs}DATA                :REM*57
1003 REM *******************************{17
      SPACEs}GASOLINE                  :REM*92
1005 :                                 :REM*216
1010 DATA"{SHFT G}","{SHFT P}HILLIPS {SHFT
     P}ETROLEUM","123-456-789-0{6 SPACEs}",
     11/85                             :REM*203
1015 DATA"{SHFT P}{SHFT O}{SHFT B}OX77,{SHF
     T B}ARTLESVILLE","{SHFT O}{SHFT K} 740
     04"                               :REM*212
1020 DATA"{SHFT G}","{SHFT T}OTAL {SHFT P}E
     TROLEUM{3 SPACEs}","12345-678-90123{4
     SPACEs}","NONE "                  :REM*75
1025 DATA"{SHFT A}LMA{16 SPACEs}","{SHFT M}
     {SHFT I} 48801"                   :REM*103
1030 DATA"{SHFT G}","{SHFT G}ULF {SHFT O}IL
      {SHFT C}ORP.{4 SPACEs}","12345-67890{
     8 SPACEs}",03/85                  :REM*104
1035 DATA"{20 SPACEs}","{8 SPACEs}" :REM*97
1099 REM *******************************{16
      SPACEs}STORES                    :REM*15
```

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```
1100 DATA"{SHFT S}","{SHFT S}EARS {SHFT R}O
     EBUCK & {SHFT C}O","1-23456-78901-2{4
     SPACEs}","NONE "                  :REM*82
1105 DATA"{20 SPACEs}","{8 SPACEs}":REM*167
1110 DATA"{SHFT S}","{SHFT J}{SHFT C} {SHFT
      P}ENNEY{9 SPACEs}","123-456-789-0{6 S
     PACEs}","NONE "                   :REM*26
1115 DATA"{20 SPACEs}","{8 SPACEs}":REM*177
1120 DATA"{SHFT S}","{SHFT M}ONTGOMERY {SHF
     T W}ARD{3 SPACEs}","123-456-789-0123{3
      SPACEs}","NONE "                 :REM*162
1125 DATA"{20 SPACEs}","{8 SPACEs}":REM*187
1199 REM *******************************{17
      SPACEs}OTHER                     :REM*233
1200 DATA"{SHFT O}","{SHFT M}ASTER {SHFT C}
     HARGE-{SHFT I}OWA","1234-5678-9012-345
     6",03/84                          :REM*202
1205 DATA"{SHFT P}{SHFT O}{SHFT B}OX14361,{
     SHFT O}MAHA{4 SPACEs}","{SHFT N}{SHFT
     E} 68114"                         :REM*237
1210 DATA"{SHFT O}","{SHFT I}NSTANT {SHFT C
     }ASH{6 SPACEs}","1234-5678-9012345{2 S
     PACEs}","NONE "                   :REM*102
1215 DATA"{SHFT P}{SHFT O}{SHFT B}OX{SHFT B
     }-1608,{SHFT M}INNEAP.","{SHFT M}{SHFT
      N} 55480"                        :REM*95
2099 DATA END                          :REM*223
4000 REM * * * * * * * * * * * * * * * *
                                       :REM*237
4002 REM{13 SPACEs}BUBBLE SORT         :REM*87
4010 PRINT"{SHFT CLR}{5 CRSR DNs}"TAB(10)"{
     SHFT A}LPHABETIZING"              :REM*173
4015 PRINT"{4 CRSR DNs}"TAB(10)"{SHFT A}LL
     {SHFT D}ATA":PRINTTAB(10)"{5 CRSR DNs}
     {SHFT P}LEASE {SHFT W}AIT"        :REM*212
4020 FORM=0TO2:KK=0:N=G:IFM=1THENN=SS
                                       :REM*213
4025 IFM=2THENN=O                      :REM*52
4030 FORI=0TON-1:IFEN$(M,I+1)=""THENKK=KK+1
     :GOTO4140                         :REM*21
4040 IFEN$(M,I)>EN$(M,I+1)THENK=1:GOTO4090
                                       :REM*87
4050 IFEN$(M,I)<=EN$(M,I+1)THENK=0:GOTO4140
                                       :REM*109
4090 T$=EN$(M,I):EN$(M,I)=EN$(M,I+1):EN$(M,
     I+1)=T$                           :REM*47
4140 NEXTI:IFKK<>N-1THEN4025           :REM*152
4160 NEXTM:GOTO5000                    :REM*144
5000 REM * * * * * * * * * * * * * * * *
                                       :REM*217
5002 REM{12 SPACEs}MENU 1              :REM*81
5020 GOSUB250                          :REM*209
5030 X=10:Y=5:GOSUB200:PRINT"{CTRL 9} {SHFT
      S}ELECT: "                       :REM*133
5040 Y=7:GOSUB200:PRINT"{COMD 5}1{2 SPACEs}
     {CTRL 2}{SHFT R}EVIEW {SHFT F}ILE":Y=9
     :GOSUB200:PRINT"{COMD 5}2{2 SPACEs}{CT
     RL 2}{SHFT U}PDATE"               :REM*237
5050 Y=11:GOSUB200:PRINT"{COMD 5}3{2 SPACEs
     }{SHFT Q}UIT{CTRL 2}"             :REM*221
5060 GETA$:A=VAL(A$):IFA<1ORA>3THEN5060
                                       :REM*121
5070 ONAGOTO5200,5090,5100             :REM*131
5080 GOTO5060                          :REM*145
5090 LIST1000-4000                     :REM*175
5100 REM * * * * * * * * * * * * * * * *
                                       :REM*61
5102 REM{12 SPACEs}QUIT                :REM*95
5110 PRINT"{SHFT CLR}"CHR$(142):END:REM*101
5200 REM * * * * * * * * * * * * * * * *
                                       :REM*162
5202 REM{7 SPACEs}REVIEW FILE MENU (2)
                                       :REM*228
5205 :                                 :REM*81
5210 PRINT"{HOME}{4 CRSR DNs}":FORX=5TO11ST
     EP2:PRINTCL$:NEXT                 :REM*8
```

Listing 1 continued.

```
5220 X=10:Y=5:GOSUB200:PRINT"{CTRL 9}{SHFT
     R}EVIEW:"                       :REM*170
5230 Y=7:GOSUB200:PRINT"{COMD 5}1{2 SPACEs}
     {CTRL 2}{SHFT A}LL":Y=9:GOSUB200:PRINT
     "{COMD 5}2{2 SPACEs}{CTRL 2}{SHFT G}AS
     OLINE"                          :REM*120
5240 Y=11:GOSUB200:PRINT"{COMD 5}3{2 SPACEs
     }{CTRL 2}{SHFT S}TORES":Y=13:GOSUB200:
     PRINT"{COMD 5}4{2 SPACEs}{CTRL 2}{SHFT
      O}THER"                        :REM*162
5250 Y=15:GOSUB200:PRINT"{COMD 5}5{2 SPACEs
     }{SHFT Q}UIT{CTRL 2}"            :REM*38
5260 C=0:GETC$:C=VAL(C$):IFC<1ORC>5THEN5260
                                     :REM*138
5270 IFC=5THEN5000                   :REM*152
5280 IFC=1THENX1=0:X2=2:Y1=G         :REM*218
5290 IFC=2THENX1=0:X2=0:Y1=G           :REM*2
5300 IFC=3THENX1=1:X2=1:Y1=SS        :REM*220
5310 IFC=4THENX1=2:X2=2:Y1=O         :REM*224
5330 GOSUB400:GOTO5200               :REM*246
6000 REM * * * * * * * * * * * * * * * * *
                                     :REM*197
6002 REM{12 SPACEs}INSTRUCTIONS      :REM*169
6003 REM * * * * * * * * * * * * * * * * *
                                     :REM*200
6010 PRINT"{SHFT CLR}{CTRL 9}"FI$"{CTRL 2}-
     {SHFT I}NSTRUCTIONS"             :REM*41
6030 PRINT"{SHFT D}ATA FOR EACH CREDIT CARD
      IS ENTERED"                     :REM*27
6040 PRINT"BEGINNING AT LINE 1000." :REM*67
6050 PRINT"{CRSR DN}{SHFT E}ACH CARD HAS TH
     E FOLLOWING ENTRIES:"           :REM*133
6060 PRINTTAB(5)"{CRSR DN}{CTRL 2}{SHFT T}Y
     PE{COMD 5} ({SHFT G} FOR GASOLINE, {SH
     FT S} FOR {SHFT S}TORE,{11 SPACEs}{SHF
     T O} FOR {SHFT O}THER)"         :REM*223
6070 PRINTTAB(5)"{CTRL 2}{SHFT N}AME OF CAR
     D{COMD 5} (UP TO 18 LETTERS)"  :REM*27
6080 PRINTTAB(5)"{CTRL 2}{SHFT C}ARD {SHFT
     N}UMBER{COMD 5} ( UP TO 19 NUMBERS)"
                                      :REM*71
6090 PRINTTAB(5)"{CTRL 2}{SHFT E}XPIRATION
     {SHFT D}ATE{COMD 5} (UP TO 5 CHAR-{15
     SPACEs}ACTERS)"                 :REM*107
6095 PRINTTAB(5)"{CTRL 2}{SHFT A}DDRESS{COM
     D 5} (UP TO 39 CHARACTERS IN TWO{11 SP
     ACEs}LINES)"                     :REM*26
6100 PRINT"{CTRL 2}{CRSR DN}{SHFT F}OR EXAM
     PLE, HERE IS A SAMPLE ENTRY-" :REM*103
6110 CR$=CHR$(34)                    :REM*115
6120 PRINTTAB(5)"DATA "CR$"{SHFT G}"CR$","C
     R$"{SHFT C}ONOCO{12 SPACEs}"CR$","
                                     :REM*213
6125 PRINTTAB(5)CR$"XX-XXX-XXXX{8 SPACEs}"C
     R$","CR$"05/85"CR$                :REM*0
6130 PRINTTAB(5)"DATA "CR$"1234 {SHFT M}AIN
      {SHFT S}T.,{SHFT T}AMPA "CR$","SPC(20
     )CR$"{SHFT F}{SHFT L} 11111"CR$
                                     :REM*191
6140 PRINT"{5 CRSR RTs}{COMD 5}{SHFT R}E-SA
     VE THE ENTIRE PROGRAM AFTER{11 SPACEs}
     ENTERING NEW DATA"              :REM*211
6150 PRINTTAB(8)"{CTRL 9}{COMD 5}{SHFT P}RE
     SS ANY KEY TO CONTINUE"         :REM*200
6160 GETA$:IFA$=""THEN6160           :REM*192
6170 RETURN                          :REM*108
```

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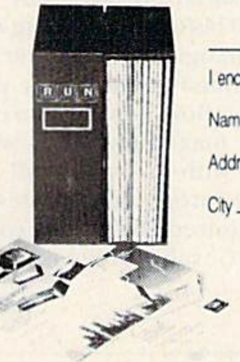

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Display It with Style

Put some pizzazz into your programs. These six modules demonstrate the MID$ function by animating your program text.

By L. JAMES CHERRY

Computers may be used for information-handling at high speeds, but the display of text improves when it is printed at a relatively slow pace. The rate should be slightly faster than normal reading speed, and never so fast that it appears to flash on the screen. Being able to control your computer's rate of text display is a desirable feature.

The accompanying Screen Print demonstration program prints text at a predetermined rate and displays it in a variety of formats. To achieve this, you use the MID$ function with one or more loops and cursor movements. This program is an excellent tutorial on the use of this function.

Each of six subroutines, or modules, performs one type of printing display. You may use any of the modules in another program by assigning your own particular phrase to the string variable in the routine of your choice. Do not make the phrase over 39 characters (including spaces and color assignments) or you may run into wrap-around and formatting problems. These routines would probably be best suited for titles and program introductions.

The MID$ function can be defined as a substring that is taken out of a larger string. For example, if A$ = "ABCDEFGHIJ", and the computer is told to PRINT A$, it will print ABCDEFGHIJ. But what if only part of A$ is needed, such as the first three characters or the two middle ones or even one at a time? This is where the MID$ comes in handy.

The function is written as MID$ (A$,X,Y), where (from left to right) the character at position X will be the first character to be printed, and Y will represent the total number of characters you want printed. Therefore: PRINT MID$ (A$,1,1) will print A; PRINT MID$ (A$,2,1) will print B; and PRINT MID$ (A$,4,3) will print DEF. To clear up any lingering confusion, enter the short MID$ demonstration program (Listing 1).

The Six Modules

When typing in the main program (see Listing 2), note the space between the CL and CD in line 600 and also between CL and CL in line 780.

The first module in Listing 2 is probably the easiest to understand. A$ is assigned a phrase in line 280, and A% (in line 290) becomes the total length of that phrase. The first example is 26 characters long and loops through the MID$ function 26 times, starting in line 300 and printing, in turn and from left to right, each character of A$. Note that in line 310 there is a TAB. In each module, this function serves to center the text on the screen.

The action takes place between lines 300 and 330. The first time through the loop, X = 1, so MID$ (A$,1,1) = "F". The next time through the loop, X = 2. The semicolon at the end of line 310 tells the computer to print the next character on the same line as the previous character, so the line should now read "FI", because MID$ (A$,2,1) = "I", and so on.

Line 320 is a short delay loop; the computer stays on this line and counts to 60 before continuing on to NEXT X. Changing this counter loop to a larger number causes the printing to slow down even more. Of course, the maximum speed would be attained with no loop at all.

After the program executes the loop the required 26 times, it continues with a Gosub statement in line

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340. The Gosub statement delays the computer for several seconds, clears the screen and returns to the next line in the program, line 350.

The second module is more complicated. First, B$ is assigned a phrase, the length established in line 430, and a new variable, Y, is assigned the length of B$ (which is 28 characters long). Instead of printing only one character at a time, the module adds one character to the previously printed character(s) as it completes the loop, reading B$ from right to left.

The first character printed to the screen is T, the last letter of B$, because MID$ (B$,28,1) = "T". Once T is printed, the cursor moves one space to the left (back over the letter), then retreats to the line above, ready to continue on the original line with the next Print statement.

In line 460, the value of Y decreases by 1 and becomes 27. After a short delay, accomplished in line 470, the program loops to line 440, where now X = 2 and Y = 27. Here, the previous character appears to move over one space, with the new character printed in its place. Actually, there is no movement; new characters are being printed over old characters. One additional character of B$ is printed, reading the string from right to left, starting at the same TAB position.

The third module is different in that it contains, within the main X loop, a nested loop, which controls the character vertically on the screen. The variable V determines how far down the screen the characters "drop" before coming to the row where the completed phrase will be printed out. Again, you want to TAB over the length of C$ (23 characters). The value of X is added to the TAB position each time through the loop, so the next character to be printed will not drop down the same column.

The MID$ function is the same as in the other modules and only prints one character at a time, reading from left to right. Except for the last time through the vertical loop, the CRSR UP, CRSR LF, CRSR DN and space instructions at the end of line 600 serve to erase each character as it drops down into position. Try leaving out the cursor movements in line 600 and see what happens. Once the vertical (V) movement has been completed, the cursor is sent to the home position and is ready for the next trip through the loop.

The effect of the fourth module is

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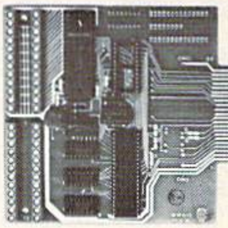

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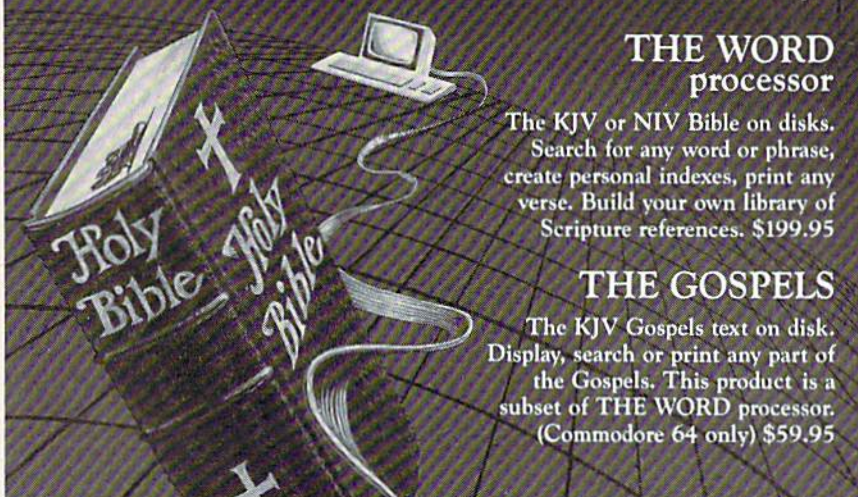

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just the opposite of the third; characters seem to float up from the bottom of the screen, landing on an upper row. To achieve this, you first send the cursor home, then have it moved down ten rows (or more if you like, by changing line 730). Once in the starting position, the first character is printed. The cursor movements in line 780 serve to erase the character as it goes up the screen and move the next printing position up one line, each time through the V loop. Once the V loop is completed, the program returns to the X loop and the next character.

The fifth module is like the first one, except that the last letter of E$ is first and the program works its way backwards—reading right to left, but printing left to right.

The sixth module prints right to left. First the TAB is set to where the last letter of the word would fall if it were printed and centered normally. Then in line 1090, each letter is printed, starting from the right-most character of F$ and moving two cursors left in each loop. This process continues until it completes the loop.

I hope you find these modules useful in some of your programs. I suggest experimenting with the cursor movements to see what develops. Ⓡ

Address all author correspondence to L. James Cherry, 2401 Arctic Fox Drive, Fort Collins, CO 80525.

Listing 1. *MID$ demonstration program.*

```
100 REM MID$ DEMO                       :REM*114
110 :                                   :REM*86
115 POKE53280,0: POKE53281,0            :REM*247
120 PRINT"{SHFT CLR}{5 CRSR DNs}"      :REM*212
130 LET A$ = "ABCDEFGHI": PRINT"{CTRL 4}"
                                        :REM*192
135 PRINT"THIS IS A DEMONSTRATION OF THE MI
    D${5 SPACEs}FUNCTION."              :REM*201
140 PRINT"{2 CRSR DNs}POSITION 123456789"
                                        :REM*252
145 PRINT"{CTRL 6}LET A$ = ";A$         :REM*173
150 INPUT"{CRSR DN}{CTRL 2}START WITH WHICH
     CHARACTER:";X                      :REM*40
155 IF X > LEN (A$) THEN GOTO 200       :REM*95
160 INPUT"{CTRL 2}{2 CRSR DNs}AND PRINT HOW
     MANY ";Y                           :REM*98
165 IF (X+Y)-1 > LEN (A$) THEN GOTO 200
                                        :REM*31
170 PRINT"{COMD 6}{3 CRSR DNs}THEREFORE: MI
    D$ (A$,";X;"{CRSR LF},";Y;"{CRSR LF}) =
     ";MID$(A$,X,Y)                     :REM*74
175 PRINT"{2 CRSR DNs}"                 :REM*227
180 PRINT"TO SEE IT AGAIN PRESS {CTRL 8}<RE
    TURN>{CTRL 6}"                      :REM*184
185 GET X$: IF X$ <> CHR$(13) THEN 185
                                        :REM*197
190 GOTO 120                            :REM*152
200 REM ===NOT VALID INPUT===           :REM*88
210 PRINT"{CRSR DN}{CTRL 8}NOT A VALID INPU
    T, TRY AGAIN..."                    :REM*244
215 FOR DELAY = 1 TO 900: NEXT DELAY
                                        :REM*195
220 GOTO 120                            :REM*182
230 END                                 :REM*232
```

Listing 2. *Screen Print demonstration program.*

```
100 REM ==============================
                                        :REM*174
110 REM{3 SPACEs}SCREEN PRINT DEMONSTRATION
                                        :REM*72
120 REM{9 SPACEs}BY J. CHERRY           :REM*26
130 REM{4 SPACEs}2401 ARCTIC FOX DRIVE
                                        :REM*12
140 REM{4 SPACEs}FT. COLLINS, CO 80525
                                        :REM*130
145 REM                                 :REM*207
146 REM                                 :REM*208
150 REM ==============================
                                        :REM*224
160 :                                   :REM*136
170 POKE53280,0:REM BORDER COLOR BLACK
                                        :REM*18
180 POKE53281,0:REM SCREEN COLOR BLACK
                                        :REM*164
190 PRINT "{SHFT CLR}": REM CLEAR SCREEN
                                        :REM*154
200 PRINT"{CTRL 5}" : REM CURSOR COLOR-PURP
    LE                                  :REM*12
210 :                                   :REM*186
220 :                                   :REM*196
230 REM ==============================
                                        :REM*48
240 REM{2 SPACEs}FIRST DEMO - CENTERED SPRE
    AD                                  :REM*134
250 REM{8 SPACEs}LEFT TO RIGHT          :REM*88
260 REM ==============================
                                        :REM*79
270 :                                   :REM*247
280 A$ = "FIRST - SLOWLY LEFT TO RIGHT"
                                        :REM*25
290 A% = LEN (A$)                       :REM*23
300 FOR X = 1 TO A%                     :REM*55
310 :{2 SPACEs}PRINT TAB((39-A%)/2)MID$(A$,
    X,1);                               :REM*51
320 :{2 SPACEs}FOR D = 1 TO 60: NEXT D
                                        :REM*67
330 NEXT X                              :REM*23
340 GOSUB 1320: REM DELAY AND CLEAR:REM*133
350 :                                   :REM*71
360 :                                   :REM*81
370 REM ==============================
                                        :REM*189
380 REM{9 SPACEs}SECOND DEMO            :REM*77
390 REM{3 SPACEs}SEEMS TO SPREAD FROM A POI
    NT                                  :REM*121
400 REM ==============================
                                        :REM*219
410 :                                   :REM*131
420 B$ = "SECOND - SPREAD FROM A POINT"
                                        :REM*221
430 B% = LEN (B$): Y = B%               :REM*153
440 FOR X = 1 TO B%                     :REM*69
450 :{3 SPACEs}PRINT TAB((39-B%)/2)MID$(B$,
    Y,X)"{CRSR LF}{CRSR UP}"            :REM*23
460 :{3 SPACEs}Y=Y-1 .                  :REM*89
470 :{3 SPACEs}FOR D = 1 TO 20: NEXT D
                                        :REM*213
480 NEXT X                              :REM*173
490 GOSUB 1320                          :REM*49
500 :                                   :REM*221
510 :                                   :REM*231
520 REM ==============================
                                        :REM*84
530 REM THIRD DEMO - DROP FROM ABOVE:REM*32
540 REM ==============================
                                        :REM*104
550 :                                   :REM*16
560 C$ = "THIRD - DROP FROM ABOVE" :REM*132
```

→

Listing 2 continued.

```
570 C% = LEN (C$)                           :REM*58
580 FOR X = 1 TO C%                         :REM*82
590 :{2 SPACEs}FOR V = 1 TO 5               :REM*212
600 :{3 SPACEs}PRINT TAB((39-C%)/2+X) MID$(
    C$,X,1)"{CRSR UP}{CRSR LF} {CRSR DN}"
                                            :REM*246
610 :{2 SPACEs}NEXT V: PRINT"{HOME}"
                                            :REM*222
620 NEXT X                                  :REM*58
630 GOSUB 1320                              :REM*190
640 :                                       :REM*106
650 :                                       :REM*116
660 REM ===============================
                                            :REM*224
670 REM{7 SPACEs}4TH DEMO{2 SPACEs}BOTTOM U
    P                                       :REM*52
680 REM ===============================
                                            :REM*244
690 :                                       :REM*156
700 D$ = "FOURTH - FROM THE BOTTOM UP"
                                            :REM*144
710 D% = LEN(D$)                            :REM*74
720 PRINT "{HOME}"                          :REM*192
730 FOR L = 1 TO 10: PRINT"{CRSR DN}"
                                            :REM*202
740 NEXT L                                  :REM*82
750 FOR X = 1 TO D%                         :REM*124
760 : FOR V = 1 TO 5                        :REM*126
770 :{3 SPACEs}PRINT "{2 CRSR UPs}"TAB(((39
    -D%)/2)+X)                              :REM*247
780 :{3 SPACEs}PRINT MID$(D$,X,1)"{CRSR DN}
    {CRSR LF} {CRSR LF}{CRSR UP}"   :REM*75
790 : NEXT V                                :REM*123
800 : PRINT"{HOME}"                         :REM*227
810 : FOR L = 1 TO 10 :PRINT "{CRSR DN}"
                                            :REM*235
820 : NEXT L                                :REM*247
830 NEXT X                                  :REM*13
840 GOSUB 1320                              :REM*145
850 :                                       :REM*61
860 :                                       :REM*71
870 REM ===============================
                                            :REM*179
880 REM{2 SPACEs}5TH DEMO - BACKWARDS LT TO
    RT                                      :REM*163
890 REM ===============================
                                            :REM*199
900 :                                       :REM*111
910 :E$ = "FIFTH - BACKWARDS LEFT TO RIGHT"
                                            :REM*175
920 :E% = LEN (E$): Y = E%                  :REM*45
930 :FOR X = 1 TO E%                        :REM*163
940 : PRINTTAB(((39-E%)/2))MID$(E$,Y,1);
                                            :REM*175
950 : Y=Y-1                                 :REM*69
960 : FOR D =1 TO 50: NEXT D                :REM*197
970 NEXT X                                  :REM*153
980 FOR D = 1 TO 1000: NEXT D               :REM*229
990 :                                       :REM*201
1000 :                                      :REM*211
1010 REM ==============================
                                            :REM*197
1020 REM{3 SPACEs}6TH DEMO{2 SPACEs}-{3 SPA
     CEs}RIGHT TO LEFT                      :REM*25
1030 REM ==============================
                                            :REM*218
1040 :                                      :REM*252
1050 F$ = "SIXTH - OPPOSITE OF THE ABOVE"
                                            :REM*100
1060 F% = LEN (F$): Y = F%                  :REM*164
1070 PRINT"{4 CRSR DNs}":PRINT TAB(((39)+Y)
     /2)                                    :REM*78
1080 FOR X = 1 TO F%                        :REM*202
1090 : PRINT MID$(F$,Y,1)"{2 CRSR LFs}";
                                            :REM*12
1100 : Y=Y-1                                :REM*220
1110 : FOR D = 1 TO 50: NEXT D              :REM*92
1120 NEXT X                                 :REM*48
1130 FOR D = 1 TO 1200: NEXT D              :REM*126
1140 :                                      :REM*96
1150 :                                      :REM*106
1160 REM ==============================
                                            :REM*92
1170 REM{5 SPACEs}PROMPT TO SEE IT AGAIN
                                            :REM*50
1180 REM ==============================
                                            :REM*112
1190 :                                      :REM*146
1200 G$ = "{CTRL 6}PRESS <{CTRL 8}RETURN{CT
     RL 6}> TO SEE IT AGAIN."               :REM*230
1210 PRINT "{10 CRSR DNs}"                  :REM*242
1220 FOR X = 1 TO LEN (G$)                  :REM*126
1230 :{2 SPACEs}PRINT TAB((39-LEN(G$)+3)/2)
     MID$ (G$,X,1);                         :REM*38
1240 :{2 SPACEs}FOR D = 1 TO 5: NEXT D
                                            :REM*222
1250 NEXT X                                 :REM*178
1260 :                                      :REM*216
1270 GET X$: IFX$=""THEN 1270               :REM*246
1280 IF X$ = CHR$(13) THEN 100              :REM*51
1290 GOTO 1270:REM IF WRONG GO BACK:REM*201
1300 END                                    :REM*27
1310 :                                      :REM*11
1320 REM ==DELAY BEFORE NEXT DISPLAY==
                                            :REM*13
1330 FOR D = 1 TO 1600: NEXT D              :REM*75
1340 PRINT "{SHFT CLR}"                     :REM*55
1350 RETURN                                 :REM*133
1360 :                                      :REM*61
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SOFTWARE BUYER'S GUIDE

1985 • Part I

Hundreds of new programs have been released in 1985 for the Commodore computers, and a new category for the C-128 has been included in this guide.

This is Part I of the Software Buyer's Guide. Part II will appear in next month's issue.

In Part I, we cover business and finance, education, games, graphics, hobbies and unusual applications, and a new software category for the C-128. All programs in this last category may be used in the C-128 mode, and all programs in the other categories may be used on the C-64 and on the C-128 in C-64 mode.

In each category, programs are listed alphabetically by program name, followed by a short description of the product, the current suggested retail price and the name of the manufacturer. To obtain more information on any product listed, consult the manufacturers' address list at the end of the guide and contact the manufacturer directly.

While *RUN* has tried to make this list as comprehensive and accurate as possible, the information was derived from a questionnaire sent to the manufacturers, and we are therefore not responsible for any omissions or errors of fact contained herein.

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Division Shooting Gallery
Ducks containing division fact problems move across the screen in a shooting gallery format; correct answers allow the student to shoot down the ducks. $39.95; $54.95 with backup disk
Gamco Industries, Inc.

End Punctuation
Provides drill in the use of end punctuation and motivates students with an arcade-style reward game. $39.95; $54.95 with backup disk
Gamco Industries, Inc.

European Nations and Locations
Learn about European countries, their geographies, history and current events. $44.95
Designware, Inc.

Exploring Logo
A set of software and activity cards that introduces students to the computer, logic and programming. $59
Sunburst Communications

For Kids Only
Sixty new educational software packages for children ages 1–16. $11.95
KIDware

Genesis 2
A lesson-authoring system that allows teachers or parents to create computer exercises in a question-and-answer format. $20
Greenwood Software

The Great Gonzo in WordRider
Strategy adventure game that helps your child develop vocabulary and word-usage skills. $29.95
Simon & Schuster Electronic Publishing Group

Hide 'N Sequence
Unscramble sentences from a literary passage until it matches the original version. $69
Sunburst Communications

Kermit's Electronic Storymaker
Designed to help children aged four and up develop their reading, writing, vocabulary and grammar skills. $39.95
Simon & Schuster Electronic Publishing Group

Keyboard Command
Three games to teach keyboard skills, letter recognition, word formation. $29.95
Trillium Press, Inc.

Leaps and Bounds
Develops reading readiness skills: basic letter and word recognition, counting skills and an understanding of numbers, artistic potential and music appreciation. $39.95
Muse Software

Learn German
Translates simple sentences in English into German. $69.95
International Computer Products

Learn Spanish
Translates simple sentences in English into Spanish. $69.95
International Computer Products

Linkword Language Series
Learn Spanish, French, German and Italian using a system based upon imagery, linking foreign words to acoustically similar English words. $24.95 each
Artworx Software Co., Inc.

Logic Workout
Introduces students, from the eighth grade to college level, to classical logic and syllogisms. $34.95
Avant-Garde Publishing Corp.

Lovejoy's Preparation For the SAT
Drill and practice, tips and techniques for test-taking, on-screen scratch pad, full explanations for all questions; *Lovejoy's Concise College Guidebook* included. $69.95
Simon & Schuster Electronic Publishing Group

Math Busters
Teaches children ages 8–14 the four arithmetic processes. $26.95
Spinnaker Software

Math Double Drill
Animated game teaches math skills; Tutor mode aids beginners; games can be set according to student's ability. $34.95
Cardinal Software

Math Leap Frog
Frogs containing math problems leap along the logs toward lily pads; correct answers allow the frogs to leap over the water onto lily pads. $39.95; $54.95 with backup disk
Gamco Industries, Inc.

M-ss-ng L-nks
Your computer omits the vowels from on-screen words, and you fill in the blanks. $59
Sunburst Communications

Multiplication Brigade
Multiplication problems appear in the windows of a burning building; correct answers help the bucket brigade put out the fire. $39.95; $54.95 with backup disk
Gamco Industries, Inc.

Outdoor Biology
Students gain knowledge about animals' competition for food, basic predator/prey relationships and ecological systems. $39
MECC

The Perfect Score
Computer preparation program for the Scholastic Aptitude Test exam. $69.95
Mindscape, Inc.

Picture Builder
Build-it-yourself picture kit; includes 40 build-by-number pictures or create your own; ages 8 to adult. $29.95
Weekly Reader Family Software

Pinball Math
For learning basic operations of addition, subtraction, multiplication and division. $39.95
Electronic Courseware Systems, Inc.

PlayWriter Series
Lets user write and create his/her own hardcover book. Titles inlcude Adventures in Space, Tales of Me, Castles and Creatures and Mystery! $39.95 each
Woodbury Software

Pre-Algebra Series
Designed to support the secondary curriculum for pre-algebra; compatible with many textbooks. $49.95
JMH Software of Minnesota, Inc.

Roots and Prefixes
Used in conjunction with the Word Attack! program; contains 500 words and introduces Greek and Latin prefixes, roots and words originating from them. $19.95
Davidson & Associates, Inc.

Run for the Money
Learn economic principles, with arcade-style action. $39.95
Scarborough Systems, Inc.

Same/Not Same Game; Alpha-Bee Sequence
Your child chooses which shape, color, letter or direction is different from the rest; your child sings the Alphabet Song along with a bee. For children ages 3–7. $26.95
Kidbit Software

Scrambled Verses
Makes a game out of memorizing Bible verses, poetry and other literature. $29.95
Smoky Mountain Software

Show Director
Lets your child create a variety of shows using pictures, animation, text, music and sound effects. $34.95
Mindscape, Inc.

Simple Calc
Calculator with simple operations to execute addition, subtraction, multiplication, division, squares and square roots. $29.95
Electronic Courseware Systems, Inc.

Snowdrifts and Sunny Skies
Learn about weather patterns, folklore and terminology; view a map displaying fronts and pressure areas to predict the weather. $14.95
Tri Micro

Sort 'Em 1
Children aged five and up learn biblical history by unscrambling illustrations of Bible stories. $24.95
Smoky Mountain Software

Speed Reader A
Improves adults' reading and comprehension; includes workbook. $39.95
Navarone Industries, Inc.

Speed Reader B
Improves children's reading and comprehension; includes workbook. $39.95
Navarone Industries, Inc.

Spelling and Reading Primer
This program teaches spelling and reading skills. $39.95
Eduware Services, Inc.

Spell It!
Spelling proficiency program for ages ten through adult; contains 1000 of the most commonly misspelled words. $49.95
Davidson & Associates

Spider Hunt Spelling
This arcade game provides practice in spelling skills and includes student and program management systems. $39.95; $54.95 with backup disk
Gamco Industries, Inc.

Stickybear ABC's
Full-screen, full-color animated pictures and sounds representing each letter of the alphabet; for ages 3–6. $29.95
Weekly Reader Family Software

Stickybear Basketbounce
Your goal is to accumulate points by catching colorful, bouncing, falling objects before you run out of baskets. $29.95
Weekly Reader Family Software

Stickybear Bop
Accumulate points by bopping all kinds of objects. $29.95
Weekly Reader Family Software

Stickybear Math
Kids help the Stickybear family out of some sticky situations by solving addition and subtraction problems; ages 6–9. $29.95
Weekly Reader Family Software

Stickybear Numbers
Groups of big, moving objects, such as trucks and planes, teach numbers and counting; for ages 3–6. $29.95
Weekly Reader Family Software

Stickybear Opposites
Teaches beginning learners about opposites such as up/down and full/empty; for ages 3–9. $29.95
Weekly Reader Family Software

Stickybear Reading
Hundreds of word/picture sets and thousands of put-together sentence parts in this animated learning game. $29.95
Weekly Reader Family Software

Stickybear Shapes
Three animated game activities for children ages 3–6; child names, picks and finds a shape. $29.95
Weekly Reader Family Software

Stickybear Spellgrabber
Three activities that build word skills; includes over 4000 words. $29.95
Weekly Reader Family Software

Stickybear Town Builder
Build towns, go on trips, hunt for hidden keys; your child learns map-reading skills; for ages 6–9. $29.95
Weekly Reader Family Software

Stickybear Typing
Uses jokes, riddles and action games to teach skills for typewriter and computer keyboard mastery. For all ages. $29.95
Weekly Reader Family Software

Subtraction Defenders
Students defend castle by typing correct answers to subtraction problems to shoot down fireballs. $39.95; $54.95 with backup disk
Gamco Industries, Inc.

Success with Reading
An educational and software book series for grades 3–6, to help students and teachers reinforce reading, spelling and syntactic concepts. $179
Scholastic Software

Survival Math
Four simulations to help students apply math to everyday life. $59
Sunburst Communications

The Sweet Shoppe
A mathematics program designed for children who are just learning to count and for those who are learning addition and subtraction. $39.95
Eric Software Publishing

Tinka's Mazes
Graphics and animation encourage children to learn math and solve problems. $24.95
Mindscape, Inc.

Tink's Subtraction Fair
Children learn subtraction through games, prizes, adventures and arcades. $24.95
Mindscape, Inc.

Today in History
For each date of the year, displays important historical events and vital statistics of illustrious persons. $49.95
International Computer Products

U.S. Constitution Tutor
Presents material on the Constitution in a logical and straightforward manner. $35
MicroLab

Wally's Word Works
Combines the fun of a video game with practice in the use and understanding of the nine parts of speech. $69
Sunburst Communications

Wordfinder
Designed to strengthen vocabulary and spelling skills in children aged 10 and up. $34.95
CBS Software

Wordplay
Five language-development games for young users. $14.95
Apropos Technology

You Can Do Math!
A junior-high level mathematics tutorial designed for students who have trouble with math. $49.95
Microtechnic Solutions

Games

1984 Teams Data Disk (Quarterback)
Contains player statistics for all 1984 teams and several historical NFL teams. $15
Strategic Simulations, Inc.

CCI Subwar 64
You're in control of a nuclear-powered submarine; your mission is to sail from port, dive, attack, sink surface ships and survive attacks. $19.95
Clockwork Computers, Inc.

F-15 Strike Eagle
Air combat from the electronic cockpit. $34.95
MicroProse Software, Inc.

A Christmas Adventure
With Christmas only hours away, you must find Santa, who has mysteriously disappeared from his ice castle at the North Pole. $24.95
BitCards

AcroJet—The Advanced Flight Simulator
Participate in decathlon of aerobatic events in your jet. $34.95
MicroProse Software, Inc.

Adventure Master
Allows you to create your own adventures; includes three games. $44.95
CBS Software

Alice in Videoland
A graphics adventure game based on Lewis Carroll's satiric fantasy. $19.95
Artworx Software Co., Inc.

Backgammon 64
Gammon and backgammon tournament-level games, with user-selectable multicolor board, sound and doubling cube. $29.95
Future Age Computers

Ballblazer
Split screen and 3-D graphics give you and your opponent a first-person view of the field of play; race across the playfield in your Rotofoil trying to capture the ball and fire it. About $32
Epyx, Inc.

Barbie
Buy new clothing or create designer clothes for Barbie; cut her hair or make it longer; many combinations. $39.95
Epyx, Inc.

Beach Head II
Picks up where the original Beach Head left off. $39.95
Access Software

Black Thunder
Drive your super-powered car armed with missiles and other weapons. $19.95
Avalon Hill Game Co.

Blue Moon
Five screens of arcade action highlight this British import. $19.95
3R Import and Export Corp.

BridgePro
Card game of bridge, with one- and two-player options, random hands and help features for beginners. $35
Computer Management Corp.

Cartels & Cutthroats
Run your own megabucks corporation in the economic jungle of big business. $39.95
Strategic Simulations, Inc.

Championship Lode Runner
The action is more difficult in this sequel to the original game. $34.95
Broderbund Software

Chessmate
This chess program saves and prints games; uses single-stroke commands to memorize any board and recall after playing through variations. $29.95
Cardinal Software

Chipwits
A game that introduces the basic concepts of computer programming. $34
Epyx, Inc.

Colonial Conquest
Strive for world control in this simulation of the Age of Imperialism. $39.95
Strategic Simulations, Inc.

Computer Ambush
Man-to-man combat in WWII. $59.95
Strategic Simulations, Inc.

Computer Quarterback
This game lets you play semi-pro or pro versions of football. $39.95
Strategic Simulations, Inc.

Corom
A graphics adventure game in which you free the princess from the Evil Sorcerer. $19.95
Tri Micro

Countdown to Shutdown
Wend your way through a 2000-room power plant to repair the power cord. $29.95
Activision, Inc.

Crusade in Europe
A simulation of the American and British struggle against Germany, from the D-Day Invasion to the Battle of the Bulge. $39.95
MicroProse Software, Inc.

Dave Winfield's Batter Up!
Practice your batting skills; tutorial on the art of hitting. $39.95
Thorn EMI Computer Software

Dawn Patrol
A real-time World War II submarine simulation game. $24.95
Mark of the Falcon

Decision in the Desert
You are in command in 1940–1942 North Africa. $34.95
MicroProse Software, Inc.

The Dolphin's Rune: A Poetic Odyssey
This game draws the player into a mystical underwater world and a quest for the secret to ancient dolphin lore. $29.95
Mindscape, Inc.

Dreadnaughts
Become Admiral of the World War II battleship Bismarck or relive any naval battle of the first three years of the war. $30
Avalon Hill Game Co.

Entertainer 1
Contains three games: In Trobots, you defend the city against invaders; Shields Up puts you on a destroy mission deep in a nuclear base; Star Crash lets you captain an orbiting space station. $14.95
Tri Micro

Escape
Use your logic and problem-solving abilities to find a way to escape from your alien jailors. $25
Infinity Software

Essex
An electronic novel and game in which different outcomes are possible. $39.95
Broderbund Software

Eureka
Solve mystery to win $25,000 prize; five games in one. $39.95
Handic Software

Exodus: Ultima III
Command four-player party to track down and destroy Exodus. $34.95
Origin Systems, Inc.

Expedition Amazon
Lead your expedition into the rain forest to find the ruins of a fabled Inca citadel. $34.95
Penguin Software

Falcon Patrol II
You control a Falcon Fighter to combat the enemy's helicopter-attack squadrons. $19.95
Artworx Software Co., Inc.

Fermi-Pico-Bagels
Game in Logo requiring you to use deductive logic to find secret number generated by the computer. $19.95
Trillium Press, Inc.

Field of Fire
Lead the Easy Company of the First Infantry Division through eight historical battles in North Africa and Europe. $39.95
Strategic Simulations, Inc.

Fix-up the Mix-up Puzzler
An electronic jigsaw puzzle featuring six of Dr. Seuss' storybook characters. $29.95
CBS Software

Frogger II Threedeep!
A three-screen game beginning with an undersea battle against deadly creatures and the undercurrent. $34.95
Simon & Schuster Electronic Publishing Group

G.I. Joe
Check the computerized World Hot-Spot Map for Cobra activity. Pick the area that needs your help and select any of 16 G.I. Joes for your mission. About $32
Epyx, Inc.

Games Disk
Includes five games: blackjack, Poker-64, craps, slots and Star Trek. $14.95
RAK Electronics

Gemstone Warrior
Find the caverns and recover the magical gemstone. $34.95
Strategic Simulations, Inc.

Ghostbusters
Based on the movie. $34.95
Activision, Inc.

Ghost Town
A graphics adventure game in which your assignment is to quiet the spirits haunting the township. $19.95
Tri Micro

Ginger the Cat
Teach children about colors, shapes, letters, numbers and simple arithmetic; includes game disk. $34.95
Cardinal Software

The Great American Cross Country Road Race
You must deal with changing road conditions and speed traps at speeds of up to 100 miles per hour. $29.95
Activision, Inc.

Gryphon
Battle the gryphon in the sky. This arcade-fantasy game features five levels of sound and animation. $19.95
Avalon Hill Game Co.

Gunship—The Helicopter Simulation
Attack-helicopter action in the AH-64 Apache. $34.95
MicroProse Software, Inc.

The Halley Project
Players complete a series of navigational tests in a space simulation game. $39.95
Mindscape, Inc.

The Heist
A secret agent plans a heist in a gallery of peril. $35
MicroLab

Hitchhiker's Guide to The Galaxy
You are forced to flee your home and hitch rides with passing spaceships. $39.95
Infocom, Inc.

Idle Time II
This collection of eight games includes testing your knowledge of U.S. cities, rearranging jumbled words and solving a cube puzzle. $19.95
Able Software

Imperium Galactum
You struggle to control the stars and create the Imperium Galactum. $39.95
Strategic Simulations, Inc.

Indiana Jones in the Lost Kingdom
Help Indiana Jones solve puzzles and riddles. $29.95
Mindscape, Inc.

International Hockey
Provides the same action as its predecessor, Slap Shot Hockey, including speech synthesis and two-player action. $24.95
Artworx Software Co., Inc.

Jet Combat Simulator
Re-create the high-speed aerodynamic performance of a McDonnell Douglas F-15 Eagle. About $32
Epyx, Inc.

Jupiter Mission 1999
Two-disk package contains 11 different arcade/strategy tests in your quest of the warship Space Beagle; an interactive space game. $35
Avalon Hill Game Co.

Jury Trial II
Courtroom strategy game for two or more players. $49
Navic Software

Kampfgruppe
A tactical game of armored warfare encompassing almost all ground weapons used on the Russian Front from 1941–45. $59.95
Strategic Simulations, Inc.

Karateka
Karate game. $29.95
Broderbund Software

Kennedy Approach
Air traffic control tower game. $34.95
MicroProse Software, Inc.

Kid Pro Quo
Combines a word processor with drawing, sprite animation and music. $29
Softsync, Inc.

Mad Magazine's Official Spy vs Spy
Challenges you and your opponent to escape from an embassy; includes 36 three-dimensional rooms. $29.95
First Star Software, Inc.

Master of the Lamps
Help a young prince recapture his kingdom from evil genies. $29.95
Activision, Inc.

Mech Brigade
A grand-tactical simulation of modern armored warfare, featuring over 70 different weapons types. $59.95
Strategic Simulations, Inc.

Microbroker
Stock market simulation teaches players to invest, based on their net assets. $34.95
Cardinal Software

MicroLeague Baseball
Strategy simulation of baseball team management. $39.95
MicroLeague Sports Association

Mig Alley Ace
Authentic simulation of air combat in the Korean war; includes five separate scenarios. $34.95
MicroProse Software, Inc.

Mindshadow
A buzzard is your guide as you enter the unknown. $29.95
Activision, Inc.

Mindwheel
Take a journey into the minds of four deceased people; includes disk and hardcover book. $39.95
Synapse Software

Miner 2049er II
This sequel to 2049er offers ten all-new action screens and jumping and climbing challenges. $35
MicroLab

Moebius: The Orb of Celestial Harmony
One-player fantasy role-playing game in an Oriental setting; animated martial arts and sword combat. $59.95
Origin Systems, Inc.

Monty Plays Scrabble
Play Scrabble against your computer or a friend. $35
Epyx, Inc.

Mr. Golf
The game is a complete 18-hole course with the standard hazards, such as trees, water holes and sand traps. $22.95
Apcad Software

Mystery Master: Felony!
Solve 12 crimes; includes map, case profiles, suspects and clues. $34.95
CBS Software

NATO Commander
Command NATO forces in a confrontation with the Warsaw Pact. $35
MicroProse Software

On-Court Tennis
This tennis game plays like the real thing. $29.95
Gamestar, Inc.

On-Field Football
This game places you in the middle of the action and allows you to create your own plays. $29.95
Gamestar, Inc.

On-Track Racing
Experience the essence of real racing against a champion computer racer or a friend. $29.95
Gamestar, Inc.

Operation Market Garden
The massive Allied airborn assault to capture the bridges of Holland in 1944. $49.95
Strategic Simulations, Inc.

Perspectives
Three-dimensional graphics animation program. $39.95
Pioneer Software

Phantasie
A multiple-character role-playing game set in medieval times. $39.95
Strategic Simulations, Inc.

Pitstop II
Combine strategy and driving skill to beat your opponent. $35
Epyx, Inc.

Quink
Eliminate, before your time is up, those entries among eight that do not share a common association. $34.95
CBS Software

Racing Destruction Set
Test your racing skill with stock cars, formula 1s for Grand Prix races, dirt or street bikes, jeeps, baja bugs, pickup trucks and lunar rovers. $32.95
Electronic Arts

Raid on Bungeling Bay
Your mission is to stop a war machine from destroying the earth. $29.95
Broderbund Software

Rails West!
Returns you to the days of the developing railroad business. $39.95
Strategic Simulations, Inc.

Rainy Day Fun
Provides children ages 5–9 with ten games and puzzles. $39.95
Thorn EMI Computer Software

Real Estate 64
Monopoly-type game; play in any of six languages in any city, even your own neighborhood. $39.95
Handic Software

Rescue on Fractalus!
Your mission is to fly your Valkyrie fighter through the Jaggie defenses and rescue the downed Ethercorps pilots. About $32
Epyx, Inc.

Rock 'n Bolt
A game of strategy and action. $29.95
Activision, Inc.

Rug Rider
With your magic carpet, you set out to seek fame and fortune and adventure. $14.95
Tri Micro

Saucer Attack!
Defend Washington, DC, from an invasion of flying saucers. $29.50

Seastalker
Junior-level interactive fiction game for ages nine and up. $49.95
Infocom, Inc.

Silent Service—The Submarine Simulation
World War II submarine action in the South Pacific. $34.95
MicroProse Software, Inc.

Six Gun Shootout
Simulation of man-to-man combat in the Old West; includes ten scenarios (historically accurate and fictional) and 18 weapons. $39.95
Strategic Simulations, Inc.

Slap Shot Hockey
Features two-player breakaway action and a scrolling screen. $19.95
Artworx Software Co., Inc.

Solo Flight
Realistic flying game. $34.95
MicroProse Software, Inc.

Space Taxi
Successfully steer the hack through 24 screens. $29.95
Muse Software

Spelunker
Combines the arcade action of a maze-style game with the strategy of an adventure game. $29.95
Broderbund Software

Spy Hunter
Fast-action shooting and driving game. $44.95
Simon & Schuster Electronic Publishing Group

Spy vs Spy II: The Island Caper
Players compete to uncover and assemble a missile before a volcano blows up. $29.95
First Star Software, Inc.

Star League Baseball
Video baseball. $29.95
Gamestar, Inc.

Star Rank Boxing
A game that focuses on the art of boxing. $29.95
Gamestar, Inc.

Star Trek: The Kobayashi Alternative
Interactive Star Trek text adventure; Star Fleet Command challenges players to find and neutralize the "Bermuda Triangle" of space. $39.95
Simon & Schuster Electronic Publishing Group

Stealth
Pilot your high-speed fighter 10,000 miles in search of the Black Tower. $29.95
Broderbund Software

Stellar Conflict
This game offers sound effects, animation and the option to create your own scenarios. $49.95
Handic Software

Summer Games II
Eight new Olympic events; compete against up to seven opponents or the computer in rowing, triple jump, javelin, high jump, fencing, cycling, kayaking and equestrian. $30
Epyx, Inc.

Super Bowl Sunday
Re-create the great super bowl games; features hi-res graphics with all 22 players. Actual stats give the game further value if you become the head coach. $30
Avalon Hill Game Co.

SuperSlot 64
Simulates the mechanical three-wheel, one-arm bandit slot machine; wheels start and slow together, then stop one by one in a random manner; payoff amounts adjustable. $29.95
Future Age Computers

Super Zaxxon
Updated version of Zaxxon; takes video gamers in their space fighters to beyond the outer limits. $34.95
Simon & Schuster Electronic Publishing Group

Suspect
Murder halts the festivities at the home of a wealthy socialite, and fingers begin pointing at you. $39.95
Infocom, Inc.

Sword of Kadash
Retrieve the Sword of Kadash under guard at the Fortress of the Dragon. $34.95
Penguin Software, Inc.

Tic-Tac-Max
This game expands upon traditional tic-tac-toe. $19.95
SourceView Software International

Transylvania
Werewolves, vampires and other creatures stalk you as you search the castle and surrounding forest for the princess. $34.95
Penguin Software, Inc.

Trivia Flight
Contains more than 4000 trivia questions on three disks. $26.95
Mark of the Falcon

Trivia Plus
Trivia questions in History and Politics, Geography, the Humanities, Sports and Games, Movies, Science, Television and General Knowledge. $24.95
Academy Software

Tsushima
The climax of the Russo-Japanese war of 1905; one- or two-player strategy game. $30
Avalon Hill Game Co.

Ultima IV: Quest of the Avatar
Multi-player, multi-quest fantasy role-playing game. $59.95
Origin Systems, Inc.

Wings of War
Engage in air battles with 36 of WWII's greatest fighters and bombers. $39.95
Strategic Simulations, Inc.

Wishbringer
An interactive fiction game geared toward the introductory-level player. $34.95
Infocom, Inc.

Wizard Expansion Set
Sequel to Wizard, with 40 new screens; original Wizard required. $29.95
Progressive Peripherals & Software, Inc.

Word of Mouth
A trivia game with more than 25 categories of questions, including history, literature, sports, films, science and music. $29.95
dilithium Press

The World's Greatest Baseball Game
Uses actual players' statistics and your own game-playing ability to determine the outcome of each game. $29.95
Epyx, Inc.

The World's Greatest Football Game
Lets you develop a winning game plan, then test your strategy against the computer or another person. $32
Epyx, Inc.

Wurble
A game that encourages the use of spelling and vocabulary skills. $14.85
Sher-Tek Systems

Xyphus
Fantasy role-playing game for four players. $34.95
Penguin Software, Inc.

Graphics

3-D World 64
Create three-dimensional drawings to be viewed on-screen or printed out. $39.95
Graph-Tech Software

Adventure Construction Set
Allows you to design graphics and text adventure games for one to four players. $50
Electronic Arts

Bank Street StoryBook
Allows your child to create text and animated graphics anywhere on the screen. $39.95
Mindscape, Inc.

The Banner Machine
Prints large signs with professional-quality graphics characters; eight sizes, borders, 15 background shades and five fonts; additional fonts available. $49.95
Cardinal Software

Blazing Paddles
A graphics program; accepts input from paddles, joysticks, trackballs, light pens and touch tablets. $34.95
Baudville, Inc.

CHARED
This is a character editor that allows you to create character sets for different alphabets and correspondence. $22.95
Apcad Software

ColorMe
Gives your child the creative freedom to design his or her own pictures, coloring books and stickers, and then print them out. $29.95
Mindscape, Inc.

Easy Graph
Graphing program for children and first-time computer users from age eight to adult; create pictographs, bar and pie charts. $39.95
Grolier Electronic Publishing, Inc.

Flying Colors
This graphics drawing program is controlled almost entirely by cursor-selected functions. $39.95
The Computer Colorworks

The Graphics Magician Picture Painter
Allows you to store pictures in a minimal amount of space on a disk, so that you can recall them quickly from your own programs. $39.95
Penguin Software

Mr. Pixel's Cartoon Kit
Allows your child to select, modify or build cartoon characters and then combine the characters into cartoon features. $29.95
Mindscape, Inc.

Mr. Pixel's Programming Paint Set
Allows your child to draw on the computer screen in color and use a picture-based programming approach to create drawings. $29.95
Mindscape, Inc.

The Print Shop
Turn your computer into a personal print shop; includes 60 graphics designs or create your own. $49.95
Broderbund Software

The Print Shop Graphics Library, Disk Two
Adds 120 new graphics images to Broderbund Software's Print Shop series. Categories include jobs, hobbies, people, places, travel and health. $24.95
Broderbund Software

Show Director
Allows your child to write a script and then transfer the words into backgrounds, animated characters, music and sound effects to illustrate the story. $29.95
Mindscape, Inc.

Smart Start
Lets you design graphics and sound effects. $39.95
Muse Software

Sprite Wiz
Sprite-creation and editing tool; allows for simple animation, movement and piecing together of several sprites. $20
DJ Software

SpryteByter
Lets you design sprites. $34.95
Microtechnic Solutions

Video Title Editor
Creates titles, custom messages, colored screens and leaders without snow or noise. $29.95
Videoware

Zippy Floppy
Includes sprite builder, headline builder and picture builder programs. $29.95
Trillium Press, Inc.

Hobbies & Unique Applications

64-Beam Calc
For designers, architects, engineers and students who want to determine the deflection and stresses in a structural beam. $40
Hartley Software

CCI Super Wordfind
Can be used by teachers and crossword puzzle enthusiasts for educational or entertainment objectives. $26.95
Clockwork Computers, Inc.

ESP Tester
Test your psychic ability alone or with a friend; tests various areas of ESP and keeps score. $14.95
AC3L Software

TAS-64
Technical analysis charting; capture data from DJN/R or Warner Services, or enter and edit your data; features seven moving averages, three oscillators, trading bands, least squares, five volume indicators and relative charts. $84.95
Abacus Software

Advisor
Artificial-intelligence development system that permits your computer to replicate logical reasoning and help you to solve problems. $99.50
Ultimate Media, Inc.

Astrology Horoscope
Produces a chart wheel of planets and nine house systems. $39.95
Navarone Industries, Inc.

Be Your Own Coach
This is a runner's training tool that aims to minimize injury and maximize abilities. $79.95
Avant-Garde Publishing Corp.

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Create personalized storybooks for your children; four adventure stories to choose from, illustrated in color; kits include materials to make two books. $39.95
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Companion to Personality Analyzer program; see yourself as others see you. $39.95
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Chipwits
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Utilizes focus recognition to expand your capacity to perceive and classify information. $49.95
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Logging and duplicate contact-checking are fully integrated with automatic transmission of Morse code; designed for practical real-time use during amateur radio contests. $39.95
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Allows you to evaluate personal, financial and business problems and print out the best solution. $29.95
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With Computer Continuum's analog interface board, this program turns your computer into a dual-trace digital oscilloscope. $75
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An artificial intelligence program that responds to questions and answers. $14.95
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Identifying characteristics of ducks and the ways humans interact with them. $39
MECC

Family Medical Advisor
Designed to diagnose illness, poisoning or the effects of drug abuse. $38
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Predicts outcome of NFL, USFL and college football games using team strength as a basis; designed to beat the point spread. $99.95
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Attempts to help you understand the science of weather prediction and the causes and effects of weather. $49.95
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Gold Dog Analysis
A dog race analysis that predicts results of daily races based on racing-form information. $149.95
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Complete text of the Gospels, with programs to access, search, display and print the text. $59.95
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Comprehensive and flexible grade calculation, for teachers in all areas of education. $69.95
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The Great International Paper Airplane Construction Kit
This construction kit makes digital aviation easy—just print, fold and fly; based on the book. $29.95
Simon & Schuster Electronic Publishing Group

Ham Radio Disk
Comes with 12 amateur radio applications programs, including Ham Antennas, Morse Trainer, Morse Code, WAS Record, WAZ Record and DXCC Record. $14.95
RAK Electronics

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Word-search puzzle generator. $19.95
Smoky Mountain Software

The Horse Computer
Gives a class rating for each horse in a race and determines which horses are running out of their classes. $29.95
H&E Computronics, Inc.

The Hypnotist
Helps you to change your behavior, reduce stress and improve memory; includes biofeedback heart-rate monitor. $109.95
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Parsons Software

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Springboard Software, Inc.

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Re-enact any presidential election from 1960 to 1984. $39.95
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Principles of Composition
This tutorial teaches you about color, texture, composition, designs, shapes and patterns. $149
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Professional Electronic Engineering
Features circuit analysis and modification, active filters design and analysis, bode plots and polynomial roots. $39.95
Bamtek Co.

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Jance Associates, Inc.

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Learning tool to remember information and relationships; essential for studying history, vocabulary, foreign language, chemistry and other subjects. $79.95
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Analyzes thoroughbred racing information taken from the *Daily Racing Form*. $25
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UHL Research Associates, Inc.

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Complete text of the Bible, with programs to access, search, display and print the text. $199.95
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This horse-race analysis program predicts the results of daily races based on racing form information. $159.95
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Topical cross reference for over 200 biblical subjects. $49.95
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Stores the results of up to ten races on disk and will reevaluate the factor values and odds. $149.95
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Keeps track of up to 150 video programs on up to 50 videotapes. $49.95
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Able Software
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Mineola, NY 11501

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3215 N. Frontage Road
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Kittery, ME 03904

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Los Angeles, CA 90045

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Chester, NH 03036

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FS! Software
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Rome, GA 30161

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La Canada, CA 91011

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18022 Delano St.
Reseda, CA 91335

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Los Angeles, CA 90048

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Miami Beach, FL 33139

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Santa Barbara, CA 93117

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5500 Atherton St.
Suite 306
Long Beach, CA 90815

Weekly Reader Family Software
245 Long Hill Road
Middletown, CT 06457

Winner's Edge Software
2003 Sarazen Place
Reston, VA 22091

Woodbury Software
127 White Oak Lane, CN #1001
Old Bridge, NJ 08857

From p. 13.

```
PEEK(63) + 256*PEEK(64)
```

If I'm using that specific Peek a lot, I add the following line early in my program.

```
100 DEF FNP(X) = PEEK(63)  +  256 * PEEK(64)
```

Then, whenever I want this information, I just type

```
PRINT FNP(X)
```

where X is a dummy argument.

If I want to read bit B from memory location M, I use DEF FN with multiple arguments as follows.

```
200 DEF FNR(B) = (PEEK(M) AND 2↑B) / (2↑B)
```

To use it to read bit 3 of memory location 32768, enter:

```
290 M = 32768 : PRINT FNR(3)
```

Other examples are numerous. Just remember the key: Any complex, often-used arithmetic expression can be abbreviated in this fashion.

Dan Reisberg
Brooklyn, NY

$280 **Random numbers**—The general formula for producing a random number between A and B is:

```
N = RND(0)*(B – A) + A
```

If you wanted to choose Ns between 30 and 40, for example, you would use:

```
N = RND(0)*(40 – 30) + 30
```

You could combine the numbers inside the parentheses, of course, and if you wanted only integers as N, you could use the INT function to get it or use N% rather than N. To correct for the downward rounding in these cases, change the quantity inside parentheses to (1 + B – A).

Mary D. Brigito
Old Forge, NY

$281 **12-day calculator**—This totals the number of gifts in the famous Christmas song. By following its logic, you can learn about nested loops.

```
100 REM 12 DAYS OF CHRISTMAS – KRINGLE
110 FOR DAY = 1 TO 12
120 FOR PRESENT = DAY TO 1 STEP – 1
130 PRINT PRESENT;
140 NUMBER = NUMBER  +  PRESENT
150 NEXT PRESENT
160 PRINT
170 NEXT DAY
180 PRINT "TOTAL PRESENTS = " NUMBER
```

Kris Kringle
Santa Claus, IN

$282 **Detecting peripherals**—When a program is running, you can determine whether a specific device is on-line by executing the following, where DN is the device number in question.

```
40 OPEN15,DN,15:CLOSE15
50 DI$ = "OK":IFST < > 0THENDI$ = "OFF LINE"
60 PRINTDN;DI$
```

The key is to access the peripheral through channel 15, and then read the status variable ST. If it has a non-zero value, the peripheral is off-line.

Fred Roberts
Charlotte, NC

$283 **Text centering tip**—When using a word processor, it's sometimes desirable to center a block of text as a unit, rather than line by line. For instance, if you wanted to center:

From: J. Lee
Riverside, CA
To: Alexander Papatheophilus
Greece

you'd want to do it as shown, with "From" directly above "To" and the first letters of the names and addresses lined up.

But with most word processors, each line would be individually centered, and the results would be chaotic. A solution is at hand if your word processor recognizes what is called a hard space. (In PaperClip and others, you get a hard space by typing a shifted space.)

If you turn on centering, but use hard spaces for the leading and trailing spaces, the whole block will be centered as a unit. In the above example, when typing the last line, you'd use hard spaces from under the T in To to the G in Greece and from the last letter in Greece until you were under the last letter of Al's last name.

Jerry W. Lee
Riverside, CA

$284 **Tape counter trickery**—If your tape counter gets out of sync with your tape, you can easily locate your desired program by first loading or verifying any program on the tape. That puts your tape at the start of the next program, whose normal starting number is the key to the trick. Let's call that number the current program's normal starting number, or CNSN. If your counter showed that number right now, you wouldn't have a problem. To get to the desired program, move your tape to the counter number determined by this formula, where DNSN is the desired program's normal starting number:

Counter Reading = Present Reading + (DNSN – CNSN)

If the number happens to be negative, add 1000 to it. If it's over 1000, subtract 1000.

Norman K. Creter
Cleveland, OH

$285 **Disk doctor**—Do you have a disk that absolutely will not format properly? Try erasing it with a bulk eraser of the kind used to erase magnetic tapes. I have used this trick to reclaim several disks of the bargain variety.

During this process, be sure to keep the disk in its protective envelope to lessen the possibility of contaminating it. Don't worry—the magnetic field will go right through the protective envelope.

Scott Bouslog
Muncie, IN

$286 **Selective directories**—If you want to get a directory of all files of a certain type, you can use one of the following commands.

```
LOAD"$* = P",8 loads PRG files only
LOAD"$* = S",8 loads SEQ files only
LOAD"$* = R",8 loads REL files only
LOAD"$* = U",8 loads USR files only
```

David Lim
Pasadena, CA

$287 **Naming programs**—I use a standard method for naming programs that involve a loader program. (These tend to be machine language programs that have a Basic loader or Basic programs where one part is loaded by another.)

If I have a two-part chess game, I name the first part "CHESS" and the second part " CHESS". Note the space before the C in the second program.

This way, it's easy to see which programs go together when viewing the disk menu or copying programs. As an added benefit, the second program name doesn't list on the C-64.MENU program that is included on many Commodore disks.

Dave Brown
Wandering River, Alberta
Canada

$288 **Disk Carrier**—The Rubbermaid No. 3871 five-cup Square Servin' Saver, available in most discount stores, makes an excellent storage box for disks. It is water- and dust-tight and will hold up to 25 disks. I bought mine for 99 cents.

Marty Amorin
Iowa City, IA

$289 **Disk mailer**—Having trouble with disks getting bent in the mail? Get a six-inch square of Styrofoam insulation about one inch thick, put your disk on top of it and wrap it in brown paper. The package is bend-resistant beyond belief, and the styrofoam is so light that it doesn't add to the cost of the postage.

Brian Gasperich
Houghton, MI

$28A **Printing on envelopes**—I use my printer for addressing envelopes, but sometimes the envelope slides around as it moves out of the range of the friction-feed device. I solve the problem by inserting a full-size sheet of paper under the envelope's flap, then feeding the envelope-paper combination into the printer.

Also, if your printer has a thickness lever, it's a good idea to set it to "thick" while printing on envelopes.

Alfred Lusher III
Cold Spring, KY

$28B **Paper alarm**—It's a good idea to ink a big cross on the third-to-last sheet of paper in the tray. This gives you a timely warning of imminent paper exhaustion.

Ian Haynes
Westville, South Africa

$28C **Thermal paper**—If you're not happy with the way your thermal transfer printer works with standard computer paper, be aware that Hammermill makes fanfold paper (item #19900-0) specifically for thermal transfer technology. The paper contains micro perforations and is very smooth on one side. The results are excellent, and the price is comparable to standard computer paper.

Doug Mlodzinski
Canandaigua, NY

$28D **Ghostbusters buster**—If you like the Ghostbusters game for the C-64, but don't think $10,000 is enough to get started with, I've got some good news.

When you're asked for your name at the beginning of the game, type OWEN. When the computer asks if you have an account, answer Yes. When asked for your account number, simply type LIST. The vehicle selection screen will appear, and you'll start the game with $720,000.

Russel Swift
Address Unknown

$28E **Reset curiosity**—When powering up or resetting, hitting the restore key will bring the system to a halt. The computer won't be able to continue, as evidenced by the shrunken border that persists until you reset the system again.

Craig Johnson
Juneau, AK

$28F **Travel tips**—When you travel with your computer, always take along a good extension cord and a three-prong adapter for the ac wall socket. It's not a bad idea to take a multi-socket power strip, either, just in case you run out of outlets.

R.W.P. Patterson
Stone Mountain, GA

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From p. 47.

```
0079 C9 20 B0 3B C9 0D 90 34 F0 35 C9 AB 05
0080 0E F0 19 C9 11 F0 2A C9 12 90 26 EC 04
0081 F0 0F C9 14 F0 23 C9 1C 90 1C C9 9A 05
0082 1D F0 18 4C A1 0D AD AF 41 C9 08 DF 04
0083 D0 05 A9 00 8D AF 41 20 CC FF AD E6 05
0084 AF 41 20 D2 FF 4C 1A 0E C9 7F 90 81 05
0085 24 C9 81 F0 20 C9 8D 90 F1 C9 92 05 07
0086 F0 D8 C9 8E F0 D4 C9 90 F0 D0 C9 1B 09
0087 91 F0 E1 C9 94 F0 DD C9 9D F0 D9 12 09
0088 C9 A0 90 C0 AD AF 41 C9 08 D0 05 54 06
0089 A9 00 8D AF 41 AD AF 41 20 D2 FF 0D 06
0090 AE 08 42 E0 00 D0 20 C9 20 B0 0B C6 04
0091 C9 0D F0 15 C9 14 F0 11 4C 20 0E 8E 04
0092 C9 80 90 0A C9 8E 90 0F F0 04 C9 F2 05
0093 A0 90 09 4C 5E 0E AD AF 41 8D 4D C5 04
0094 41 AE 50 41 E0 00 F0 2F AE 3C 41 08 05
0095 E0 01 F0 08 A2 00 8E 5B 41 4C 2C 7C 04
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0097 20 CC FF AE 1E 41 E0 01 D0 01 60 6B 05
0098 AD 4D 41 C9 22 D0 04 A9 00 85 D4 5E 05
0099 A2 00 8E B2 41 4C E5 0B AD AF 41 5F 05
0100 C9 14 D0 0D AE DC 41 E0 00 F0 69 22 06
0101 CE DC 41 4C D5 0E C9 0D F0 62 AE 55 06
0102 DC 41 9D DF 41 E8 8E DC 41 E0 29 DC 06
0103 90 51 C9 20 F0 58 C9 23 F0 54 C9 72 06
0104 2A F0 50 C9 2B F0 4C A2 2D F0 48 09 06
0105 A2 01 8E DD 41 A2 27 8E DE 41 BD EB 05
0106 DF 41 C9 22 F0 18 C9 24 F0 14 C9 37 06
0107 28 F0 10 C9 30 90 33 C9 3A 90 08 EA 04
0108 C9 41 90 2B C9 5D F0 27 AE DE 41 3B 06
0109 CA 8E DE 41 E0 14 F0 14 EE DD 41 E8 06
0110 BD DF 41 4C A5 0E 4C 1A 0E A2 00 60 04
0111 8E DC 41 4C 1A 0E A2 01 8E DC 41 DC 04
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0113 00 86 D4 AE DD 41 8E DC 41 A9 9D 88 06
0114 20 D2 FF CA E0 00 D0 F6 AE DD 41 9F 07
0115 CA CA A9 20 20 D2 FF E0 00 D0 F6 67 07
0116 AE DE 41 E8 8E DE 41 BD DF 41 20 D3 06
0117 D2 FF E0 28 90 EF A2 00 86 D4 4C 15 07
0118 1A 0E A5 D1 85 F3 18 A5 D2 6D 51 D9 05
0119 26 85 F4 A4 D3 B1 D1 49 80 91 D1 3A 07
0120 B1 F3 8D 52 41 AD 86 02 91 F3 60 55 06
0121 A4 D3 B1 D1 49 80 91 D1 AD 52 41 DD 06
0122 91 F3 60 20 CC FF A2 00 8E 1D 41 D7 05
0123 4C E5 0B 60 AD AF 41 C9 BE 90 03 CE 05
0124 4C 7A 15 C9 B4 90 03 4C 28 13 C9 B7 04
0125 AA 90 03 4C 55 10 C9 A1 D0 16 AE 69 05
0126 50 26 E0 01 F0 03 4C E5 0B 20 07 2B 04
0127 16 20 75 28 20 18 16 4C E5 0B C9 A5 03
0128 A2 D0 06 EE 21 D0 4C E5 0B C9 A3 7F 06
0129 D0 16 AE 50 26 E0 01 F0 03 4C E5 90 05
0130 0B 20 07 16 20 7D 26 20 18 16 4C 27 02
0131 E5 0B C9 A5 D0 51 AE 50 26 E0 01 07 06
0132 F0 03 4C E5 0B 20 07 16 A9 CD 8D F3 04
0133 19 1C A9 40 8D 1A 1C 20 0A 1C 20 CC 02
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0136 20 51 18 20 E4 FF C9 00 F0 F9 C9 8F 06
0137 18 D0 06 20 68 1C 4C 07 10 20 18 B6 02
0138 16 20 00 80 20 18 16 4C E5 0B 20 EA 02
0139 07 16 A2 84 8E 4F 26 A2 21 86 FC 16 05
0140 A2 00 86 FB AC 4F 26 B1 FB 8D AF B8 06
0141 41 20 D2 FF AD AF 41 C9 00 F0 06 1B 06
0142 20 2F 1E 4C 1D 10 20 E4 FF C9 00 40 04
0143 F0 F9 A9 30 8D 19 1C A9 24 8D 1A 87 05
0144 1C 20 0A 1C 20 00 1D 20 EF 1C 20 7A 02
0145 18 16 4C E5 0B C9 AA D0 21 20 07 86 04
0146 16 A9 42 8D 19 1C A9 26 8D 1A 1C E7 03
0147 20 0A 1C A2 00 8E 4C 41 20 BC 1E 90 03
0148 20 60 17 20 18 16 4C E5 0B C9 AB 29 04
0149 D0 35 20 07 16 A9 E4 8D 19 1C A9 CF 04
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0152 26 8D 01 DD AD 54 26 8D 03 DD 20 DD 04
0153 E7 FF 4C E2 FC 20 18 16 4C E5 0B 33 06
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Listing 1 continued.

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0155 18 16 4C E5 0B C9 AD D0 29 20 07 9B 04
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0160 96 11 20 07 16 20 EF 1C 20 2C 1C 17 03
0161 20 E1 18 AE 13 42 E0 01 D0 03 4C BD 04
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0163 A9 57 9D 86 41 E8 8E 36 41 20 DB EF 05
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0165 A2 03 20 C9 FF AC 4F 26 B1 FB C9 C8 06
0166 20 B0 0F C9 0D F0 1B C9 0E F0 17 44 05
0167 C9 11 F0 13 4C 66 11 C9 80 90 0C 2C 05
0168 C9 8D 90 15 C9 8F 90 04 C9 9F 90 87 06
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0171 90 C1 F0 03 4C 80 11 AE 4F 26 EC DB 05
0172 1F 41 B0 03 4C 31 11 20 CC FF A9 E1 04
0173 03 20 C3 FF A2 00 8E 1D 41 20 00 40 04
0174 1D 20 18 16 4C E5 0B C9 AF F0 03 C0 04
0175 4C 55 12 20 07 16 20 EF 1C 20 F9 E3 03
0176 17 20 E1 18 AE 13 42 E0 01 D0 03 97 04
0177 4C 3A 12 20 CC FF A2 04 20 C9 FF C2 05
0178 A9 11 20 D2 FF AC 4F 26 B1 FB C9 F3 06
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0180 C9 11 F0 13 4C 20 12 C9 80 90 0C F4 04
0181 C9 8D 90 40 C9 8F 90 04 C9 9F 90 BF 06
0182 38 8D AF 41 20 CC FF A2 04 20 C9 E5 05
0183 FF A9 11 20 D2 FF AD AF 41 20 D2 F0 06
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0185 20 CC FF A2 04 20 C9 FF A9 0D 20 08 06
0186 D2 FF 20 CC FF A9 04 20 C3 FF 4C 51 07
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0188 96 F0 03 4C 3A 12 AE 4F 26 EC 1F 0B 05
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0192 C9 B0 D0 3E AE 50 26 E0 01 D0 31 4D 06
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0195 8D 1A 1C 20 0A 1C 4C 91 12 A2 00 5D 03
0196 8E 1C 42 A9 A5 8D 19 1C A9 40 8D 36 05
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0211 E5 0B C9 B4 D0 06 EE 20 D0 4C E5 25 07
0212 0B C9 B5 D0 18 EE 73 26 AE 73 26 13 06
0213 E0 10 90 05 A2 00 8E 73 26 BD 63 43 05
0214 26 20 D2 FF 4C E5 0B C9 B6 F0 03 9B 06
0215 4C EF 13 20 07 16 20 29 16 A2 12 75 03
0216 BD 86 41 E8 9D 86 41 CA CA E0 FF 1B 08
0217 D0 F3 A9 24 8D 86 41 EE 36 41 20 42 06
0218 D1 1F A2 01 BD 5E 41 CA 9D 5E 41 CF 05
0219 E8 E8 E0 13 D0 F3 20 DB 17 AE 5A 7B 07
0220 41 E0 01 D0 06 20 60 17 4C C8 13 92 04
0221 20 EF 1C 20 CC FF A2 03 20 C6 FF 7D 06
0222 20 E4 FF AC 4F 26 91 FB 20 2F 1E FB 05
0223 20 07 19 20 CC FF 20 E4 FF C9 18 EE 05
0224 F0 22 AE 29 41 E0 01 F0 0A 20 4F 54 05
0225 1B AE 37 41 E0 00 F0 CF AE 4F 26 E4 05
0226 8E 1F 41 8E 21 41 A6 FC 8E 20 41 51 05
0227 8E 22 41 20 CC FF A9 03 20 C3 FF 4D 06
0228 A2 00 8E 1D 41 20 00 1D 20 18 16 FD 02
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0229 4C E5 0B C9 B7 D0 51 20 E1 18 AE 89 06
0230 13 42 E0 01 F0 41 A9 EE 8D 19 1C A6 05
0231 A9 24 8D 1A 1C 20 0A 1C 20 E4 FF C0 04
0232 C9 00 F0 F9 C9 18 F0 29 8D 28 41 8A 06
0233 20 FC 1B A9 62 8D 19 1C A9 25 8D 48 05
0234 1A 1C 20 0A 1C A2 01 8E 50 41 8E B6 03
0235 1E 41 20 A0 18 A2 00 8E 50 41 8E 71 04
0236 1E 41 8E 1D 41 20 00 1D 4C E5 0B B0 03
0237 C9 B8 D0 71 20 07 16 20 EF 1C 20 37 05
0238 E1 18 AE 13 42 E0 01 F0 5B 20 29 5F 05
0239 16 20 73 16 AE 36 41 A9 57 9D 86 F6 04
0240 41 E8 8E 36 41 20 DB 17 AE 5A 41 79 05
0241 E0 01 F0 3F 20 CC FF A2 03 20 C9 7A 06
0242 FF AC 4F 26 B1 FB 20 D2 FF 20 E4 B3 07
0243 FF C9 18 F0 28 20 2F 1E A6 FC EC E6 06
0244 20 41 90 E7 AE 4F 26 EC 1F 41 90 CB 05
0245 DF 20 CC FF A9 03 20 C3 FF 20 18 85 06
0246 16 A2 00 8E 1D 41 20 00 1D 4C E5 08 04
0247 0B 20 68 1C 4C 9D 14 C9 B9 D0 1B 10 05
0248 20 07 16 A2 01 8E 1D 41 A9 0B 8D 05 04
0249 19 1C A9 25 8D 1A 1C 20 0A 1C 20 25 03
0250 18 16 4C E5 0B C9 BB D0 03 4C E5 EC 05
0251 0B C9 BC D0 1B 20 07 16 A2 00 8E E3 04
0252 1D 41 A9 1B 8D 19 1C A9 25 8D 1A 55 04
0253 1C 20 0A 1C 20 18 16 4C E5 0B AE 97 03
0254 50 26 E0 01 D0 25 AE 3B 41 8E 12 14 05
0255 42 A9 EF 8D 19 1C A9 3E 8D 1A 1C 45 05
0256 20 0A 1C 20 58 1B AD AF 41 C9 42 81 04
0257 D0 0B A2 00 8E 3B 41 4C 40 15 4C 75 04
0258 E5 0B C9 58 F0 0A C9 18 F0 2A 20 28 06
0259 22 18 4C 0B 15 A2 03 8E 3B 41 A9 01 04
0260 BE 8D 19 1C A9 3E 8D 1A 1C 20 0A 58 04
0261 1C 20 CC FF 20 E4 FF C9 55 F0 14 31 07
0262 C9 44 F0 16 C9 18 D0 F1 AE 12 42 BD 06
0263 8E 3B 41 20 68 1C 4C E5 0B 20 D2 E3 04
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0265 6E 2B C9 BE D0 33 20 E1 18 AE 13 06 06
0266 42 E0 01 F0 26 A9 50 8D 19 1C A9 A7 05
0267 25 8D 1A 1C 20 0A 1C A2 01 8E 50 BA 03
0268 41 8E 1E 41 20 66 18 A2 00 8E 50 58 04
0269 41 8E 1E 41 8E 1D 41 20 00 1D 4C B0 03
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0271 20 2C 1C 20 E1 18 AE 13 42 E0 01 74 04
0272 F0 34 AC 4F 26 B1 FB 20 D2 FF 20 12 07
0273 2F 1E 20 30 19 20 30 19 20 CC FF 1B 04
0274 20 E4 FF C9 18 F0 1F A6 FC EC 20 B3 07
0275 41 90 DE AE 4F 26 EC 1F 41 F0 07 28 06
0276 20 E4 FF C9 18 D0 CF 20 00 1D 20 F4 05
0277 18 16 4C E5 0B 20 68 1C 4C FB 15 7F 04
0278 AD AF 41 48 A9 13 8D AF 41 20 AF 03 06
0279 1D 68 8D AF 41 60 AD AF 41 48 A9 07 06
0280 11 8D AF 41 20 AF 1D 68 8D AF 41 77 05
0281 60 A2 02 8E 4C 41 A9 30 8D 86 41 65 05
0282 A9 3A 8D 87 41 20 0E 1D 20 BC 1E 97 04
0283 60 A9 C9 8D 19 1C A9 25 8D 1A 1C 40 05
0284 20 0A 1C AE 3D 41 E0 00 D0 10 A9 F7 04
0285 D9 8D 19 1C A9 25 8D 1A 1C 20 0A 73 04
0286 1C 4C E5 0B A9 DE 8D 19 1C A9 25 8D 05
0287 8D 1A 1C 20 0A 1C 4C E5 0B 20 84 08 04
0288 1F AE 36 41 A9 2C 9D 86 41 E8 AD 32 06
0289 CF 41 9D 86 41 E8 A9 2C 9D 86 41 B6 06
0290 E8 8E 36 41 60 A9 0F AE 75 26 A0 10 06
0291 0F 20 BA FF A9 00 20 BD FF 20 C0 70 06
0292 FF 60 20 CC FF A2 00 8E 5A 41 A2 DB 06
0293 0F 20 C6 FF A2 00 8E 34 41 8E 5A A6 05
0294 41 20 E4 FF AC 34 41 99 4A 42 EE 9E 06
0295 34 41 C9 0D D0 F0 A9 00 AC 34 41 FC 05
0296 99 4A 42 AD 4A 42 C9 32 90 2F C9 09 06
0297 34 F0 2B C9 35 F0 27 C9 38 B0 23 61 06
0298 A2 01 8E 5A 41 A2 00 8E 34 41 20 BB 04
0299 CC FF 20 5F 1C AC 34 41 B9 4A 42 F7 05
0300 C9 00 F0 09 20 D2 FF EE 34 41 4C 8E 06
0301 F3 16 20 CC FF 18 60 AD 5A 41 C9 AA 06
0302 00 F0 17 A9 CF 8D 19 1C A9 20 8D C5 05
0303 1A 1C 20 0A 1C 20 A0 1C AD 4E 41 C3 03
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Listing 1 continued.

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0304 C9 01 F0 01 60 68 68 4C E5 0B A9 00 06
0305 03 A2 08 A0 00 20 BA FF AD 36 41 7B 05
0306 A2 5E A0 41 20 BD FF AD 56 41 85 B8 06
0307 FB AD 57 41 85 FC AE 58 41 AC 59 40 07
0308 41 A9 FB 20 D8 FF A9 0F 20 C3 FF AA 07
0309 20 90 16 60 A9 0F 20 C3 FF AD 76 18 06
0310 26 8D 75 26 20 90 16 20 CC FF A2 D7 05
0311 0F 20 C9 FF A2 00 8E 4C 41 A9 53 E7 05
0312 20 D2 FF AD 78 26 20 D2 FF A9 3A 48 07
0313 20 D2 FF AE 4C 41 BD 5E 41 C9 00 8A 06
0314 F0 09 20 D2 FF EE 4C 41 4C 8B 17 8D 06
0315 A9 0D 20 D2 FF 20 CC FF 20 CC FF B8 07
0316 20 A3 16 20 CC FF A9 0F 20 C3 FF 9A 06
0317 20 90 16 60 20 CC FF A9 03 AE 75 1D 06
0318 26 A0 00 20 BA FF AD 36 41 A2 86 29 06
0319 A0 41 20 BD FF A9 00 AE 56 41 AC 96 06
0320 57 41 20 D5 FF 60 A9 03 AE 75 26 21 06
0321 A0 03 20 BA FF AD 36 41 A2 86 A0 A9 06
0322 41 20 BD FF 20 C0 FF 20 CC FF 20 49 07
0323 A3 16 60 20 CC FF A9 04 AE 52 26 1A 06
0324 AC 53 26 20 BA FF A9 00 20 BD FF C7 06
0325 20 C0 FF 60 20 CC FF A2 01 20 C6 F8 06
0326 FF 20 CF FF 8D AF 41 20 CC FF 60 FB 07
0327 A9 4B 8D 19 1C A9 20 8D 1A 1C 20 A9 04
0328 0A 1C 60 20 CC FF 20 E4 FF 8D AF F8 06
0329 41 C9 14 F0 13 C9 0D F0 0F C9 18 20 06
0330 F0 0B C9 30 90 E7 C9 3A B0 E3 20 6B 07
0331 D2 FF 60 A9 B3 8D 19 1C A9 20 8D F0 06
0332 1A 1C 20 0A 1C 20 E4 FF C9 00 F0 84 05
0333 F9 60 20 EF 1C AC 4F 26 B1 FB 8D 2B 07
0334 AF 41 20 1A 0E 20 30 19 20 2F 1E 5C 03
0335 20 CC FF 20 E4 FF C9 18 F0 10 A6 C4 07
0336 FC EC 20 41 90 DE AE 4F 26 EC 1F 35 07
0337 41 D0 D6 60 A9 18 8D AF 41 20 AF A5 06
0338 1D 20 68 1C 60 20 EF 1C AC 4F 26 BF 04
0339 B1 FB 8D AF 41 20 1A 0E AD AF 41 61 06
0340 C9 0D F0 04 C9 1B D0 0B 20 9D 1D B7 05
0341 AD AF 41 CD 28 41 D0 F5 20 CC FF D8 07
0342 20 E4 FF C9 18 F0 C6 20 2F 1E A6 03 07
0343 FC EC 20 41 90 CB AE 4F 26 EC 1F 29 07
0344 41 D0 C3 60 A2 00 8E 13 42 A9 00 BA 05
0345 CD 1F 41 D0 19 A9 5C CD 20 41 D0 72 06
0346 12 A9 3F 8D 19 1C A9 25 8D 1A 1C A7 04
0347 20 0A 1C A2 01 8E 13 42 60 A2 00 29 04
0348 8E 29 41 AE 20 41 E0 D0 90 1C A2 61 06
0349 00 EC 1F 41 D0 15 A2 01 8E 29 41 29 05
0350 A9 80 8D 19 1C A9 25 8D 1A 1C 20 FA 04
0351 0A 1C 20 07 16 60 A0 00 C8 C0 00 4A 04
0352 D0 FB 60 A9 24 8D 86 41 AD 76 26 F5 06
0353 8D 75 26 20 CC FF A9 0F 20 C3 FF 0E 07
0354 20 90 16 A9 03 A2 08 A0 00 20 BA F8 04
0355 FF A9 01 A2 86 A0 41 20 BD FF 20 11 07
0356 C0 FF 20 A3 16 AE 5A 41 E0 01 D0 F6 06
0357 01 60 20 CC FF 20 E6 1C 20 CC FF BE 06
0358 A2 03 20 C6 FF 20 E4 FF 20 E4 FF F6 07
0359 20 E4 FF 20 E4 FF 20 E4 FF 20 E4 74 08
0360 FF 20 E4 FF 20 D2 FF 4C E2 19 20 C2 07
0361 CC FF A9 03 20 C3 FF 60 20 E4 FF 25 08
0362 20 E4 FF C9 00 F0 ED 20 E4 FF 8D A3 08
0363 2C 41 20 E4 FF 8D 2D 41 20 F7 19 06 06
0364 AD 2E 41 C9 30 F0 03 20 D2 FF AD 12 07
0365 2F 41 C9 30 D0 0A AD 2E 41 C9 30 C5 05
0366 F0 06 AD 2F 41 20 D2 FF AD 30 41 90 06
0367 20 D2 FF A9 20 20 D2 FF 20 E4 FF 1D 08
0368 C9 00 D0 08 A9 0D 20 D2 FF 4C A0 A4 06
0369 19 20 D2 FF 4C E2 19 A2 01 8E 2A 1D 06
0370 41 A2 30 8E 2E 41 8E 2F 41 8E 30 3E 05
0371 41 A2 00 8E 32 41 18 AE 2A 41 E0 68 05
0372 80 B0 51 6E 2C 41 B0 06 0E 2A 41 FF 04
0373 4C 0C 1A A2 00 8E 2B 41 EE 30 41 E2 04
0374 AE 30 41 E0 3A 90 17 A2 30 8E 30 E6 05
0375 41 EE 2F 41 AE 2F 41 E0 3A 90 08 E6 05
0376 A2 30 8E 2F 41 EE 2E 41 EE 2B 41 FF 05
0377 AE 2B 41 EC 2A 41 D0 D4 0E 2A 41 07 06
0378 AE 32 41 E0 01 D0 03 4C 7D 1A E0 12 06
0379 02 F0 2E 4C 0C 1A 60 A2 01 8E 2A C8 04
0380 41 8E 32 41 8E 33 41 6E 2D 41 90 2C 05
0381 08 A2 00 8E 2A 41 4C 1F 1A A2 02 49 04
0382 8E 32 41 6E 2D 41 90 DD A2 00 8E F8 05
0383 2A 41 4C 1F 1A AE 33 41 E0 01 D0 42 05
0384 CE EE 33 41 A2 00 8E 2A 41 4C 1F B6 05
0385 1A 20 CC FF 20 E4 FF C9 00 D0 F6 18 08
0386 60 A2 00 8E 4C 41 8A AE 4C 41 9D 01 06
0387 B3 41 EE 4C 41 AE 4C 41 E0 06 90 A3 06
0388 F0 60 20 EC 1B AD 46 41 CD 48 41 85 06
0389 90 05 A9 01 8D 4A 41 60 A9 00 8D 72 05
0390 4A 41 A9 30 8D 48 41 20 BD 1B 60 58 05
0391 A9 00 8D 4A 41 A9 18 8D 48 41 20 3F 05
0392 BD 1B 60 A9 00 8D 4A 41 A9 10 8D C7 05
0393 48 41 20 BD 1B 60 A9 00 8D 4A 41 2B 05
0394 A9 01 8D 48 41 20 BD 1B 60 A9 03 4E 05
0395 8D 48 41 4C 21 1B A9 02 8D 48 41 EA 04
0396 4C 21 1B A9 01 8D 48 41 20 BD 1B CC 04
0397 20 EC 1B AD 46 41 CD 48 41 90 F5 C3 06
0398 60 20 EC 1B AD 45 41 CD 49 41 90 2F 06
0399 05 A9 01 8D 4A 41 60 A9 00 8D 4A 36 05
0400 41 A9 01 8D 49 41 20 BD 1B 60 20 0A 05
0401 B7 FF 29 40 8D 37 41 60 20 CC FF 00 07
0402 20 E4 FF C9 00 F0 F6 8D AF 41 C9 8A 08
0403 03 F0 33 C9 0D F0 2F C9 14 F0 2B A6 06
0404 C9 07 F0 27 C9 1A F0 23 C9 18 F0 42 07
0405 1F C9 20 90 D7 C9 5B 90 17 C9 61 F9 06
0406 90 CF C9 7D 90 0F C9 BB F0 0B C9 22 08
0407 C1 90 C3 C9 DB 90 03 4C 58 1B 60 01 07
0408 AD 0D DC 29 7F 8D 0D DC AD 40 41 7A 06
0409 8D 0B DC AD 41 41 8D 0A DC A9 00 58 06
0410 8D 09 DC 8D 08 DC 20 D4 1B 60 AD 99 06
0411 0D DD 29 7F 8D 0D DD A9 00 8D 0B E5 05
0412 DD 8D 0A DD 8D 09 DD 8D 08 DD 60 32 07
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Listing 1 continued.

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0413 AD 0B DC 8D 40 41 AD 0A DC 8D 41 A0 06
0414 41 AD 08 DC AD 40 41 29 80 8D 3E 12 06
0415 41 60 AD 0A DD 8D 45 41 AD 09 DD 7A 06
0416 8D 46 41 AD 08 DD 60 A9 A4 8D 19 99 06
0417 1C A9 20 8D 1A 1C 20 0A 1C 60 20 0F 04
0418 5F 1C A2 00 8E 34 41 20 CC FF AE 5B 06
0419 34 41 BD 0A 1C 8D AF 41 C9 00 F0 31 06
0420 09 20 D2 FF EE 34 41 4C 15 1C 60 DE 05
0421 20 CC FF A9 93 20 D2 FF AD 18 D0 52 08
0422 09 02 8D 18 D0 A9 06 8D 20 D0 A9 FB 05
0423 01 8D 21 D0 20 5F 1C 60 20 CC FF 0C 06
0424 A9 3E 20 D2 FF 20 56 1C 60 20 CC 5E 06
0425 FF A9 1F 20 D2 FF 60 20 CC FF A9 55 08
0426 97 20 D2 FF 60 A9 5D 8D 19 1C A9 03 07
0427 20 8D 1A 1C 20 0A 1C 60 20 5F 1C CF 03
0428 A9 73 8D 19 1C A9 20 8D 1A 1C 20 36 05
0429 0A 1C 60 20 CC FF 20 E6 1C 20 5F BF 05
0430 1C A9 8A 8D 19 1C A9 20 8D 1A 1C 4B 05
0431 20 0A 1C 20 4A 1C 20 CC FF 20 56 DC 04
0432 1C 20 58 1B AE AF 41 E0 59 F0 17 3D 06
0433 E0 79 F0 13 E0 D9 F0 0F E0 4E F0 E3 08
0434 13 E0 6E F0 0F E0 CE F0 0B 4C A0 A7 07
0435 1C A2 00 8E 4E 41 4C D4 1C A2 01 6D 05
0436 8E 4E 41 AD AF 41 20 D2 FF A9 0D 15 07
0437 8D AF 41 20 D2 FF 20 5F 1C 60 20 3E 06
0438 CC FF A9 0D 20 D2 FF 60 A2 00 8E B8 07
0439 4F 26 8E BB 41 A9 00 85 FB A9 5C E4 06
0440 85 FC 60 A9 B3 8D 19 1C A9 25 8D 12 07
0441 1A 1C 20 0A 1C 60 A9 42 8D 19 1C 42 04
0442 A9 26 8D 1A 1C 20 0A 1C 60 20 9D AF 04
0443 1D AD 97 02 29 08 C9 00 F0 F4 60 5C 06
0444 A9 02 A2 02 A0 FF 20 BA FF A9 02 2E 07
0445 A2 93 A0 02 20 BD FF 20 C0 FF 60 AF 07
0446 20 CC FF A2 00 8E 10 42 AE 0F 42 2A 06
0447 E0 00 F0 06 AD AF 41 20 D2 FF AE D1 07
0448 3C 41 E0 01 F0 2B A2 00 8E 5B 41 05 06
0449 4C 2C 29 AE B2 41 E0 01 D0 0B A2 61 06
0450 00 8E B2 41 A2 01 8E 10 42 60 AE D4 05
0451 3C 41 E0 01 F0 0A AD 14 42 E0 00 FE 05
0452 F0 03 20 C4 28 20 CC FF A2 02 20 72 06
0453 C9 FF AD AF 41 20 D2 FF 20 CC FF 06 09
0454 A2 01 8E 10 42 60 20 CC FF A2 02 38 06
0455 20 C6 FF 20 E4 FF 8D AF 41 20 CC 18 08
0456 FF 60 AE 3C 41 E0 01 F0 0A AE 14 EF 06
0457 42 E0 00 F0 03 20 C4 28 20 CC FF D5 06
0458 A2 02 20 C9 FF AD AF 41 20 D2 FF E4 07
0459 20 CC FF 60 20 CC FF A2 02 20 C6 8B 07
0460 FF 20 E4 FF 8D AF 41 C9 00 F0 EE F2 08
0461 AE 3B 41 E0 03 90 1A A2 01 8E 5B 10 06
0462 41 4C 2C 29 20 CC FF AE B2 41 E0 1C 07
0463 01 D0 08 A2 00 8E B2 41 4C D2 1D 06 06
0464 60 EE 4F 26 AE 4F 26 BD B3 41 29 90 06
0465 0F 85 FD 8D AF 41 60 AE 4F 26 E0 42 07
0466 00 D0 0C AE BB 41 E0 00 F0 09 CE FF 06
0467 BB 41 C6 FC CE 4F 26 60 60 EE 4F D1 07
0468 26 AE 4F 26 E0 00 D0 05 EE BB 41 BC 06
0469 E6 FC 60 A2 04 8E 4C 41 AE 4C 41 13 07
0470 BD B3 41 C9 00 D0 06 CE 4C 41 4C CD 06
0471 44 1E AE 4C 41 BD B3 41 C9 39 D0 F7 06
0472 3B AE 4C 41 E0 00 F0 0E A9 30 AE B3 06
0473 4C 41 9D B3 41 CE 4C 41 4C 54 1E 10 06
0474 A9 31 8D B3 41 EE 4C 41 AE 4C 41 EB 06
0475 BD B3 41 C9 00 F0 0B A9 30 AE 4C 23 07
0476 41 9D B3 41 4C 78 1E AE 4C 41 A9 74 06
0477 30 9D B3 41 60 AA E8 8A AE 4C 41 55 07
0478 9D B3 41 60 A2 00 8E 4F 26 8E BB BD 06
0479 41 60 A9 06 8D 93 02 A9 00 8D 94 1B 06
0480 02 A2 00 8E 0F 42 60 20 58 1B AD 03 05
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Auto-Loaders
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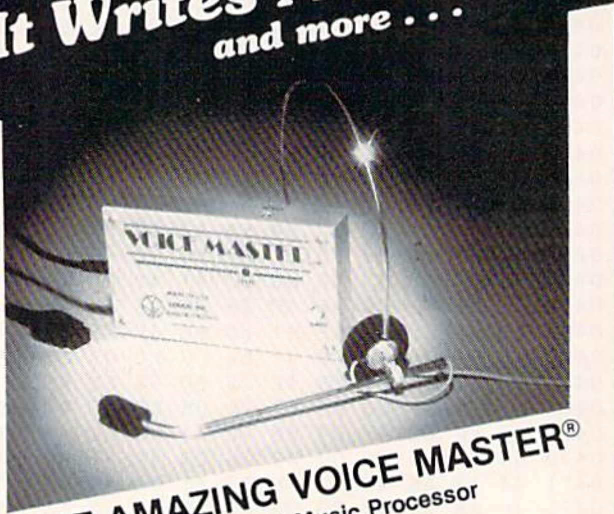

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0481 AF 41 C9 14 D0 10 20 D2 FF AE 4C 79 07
0482 41 E0 00 F0 EC CE 4C 41 4C BC 1E 60 07
0483 C9 03 D0 08 20 68 1C 68 68 4C C9 10 06
0484 0C C9 18 D0 03 4C DA 1E 20 D2 FF D9 06
0485 C9 0D D0 03 4C 06 1F AE 4C 41 E0 1A 06
0486 27 B0 0C 9D 86 41 9D 5E 41 EE 4C A3 06
0487 41 4C BC 1E AE 4C 41 A9 00 9D 86 55 06
0488 41 9D 5E 41 8E 36 41 60 20 CC FF B5 06
0489 20 F9 17 A2 04 20 C9 FF A9 11 20 81 06
0490 D2 FF A2 00 8E 4C 41 AE 4C 41 BD 70 07
0491 00 5B C9 00 F0 09 20 D2 FF EE 4C 33 07
0492 41 4C 2A 1F A9 0D 20 D2 FF 20 CC 55 06
0493 FF A9 04 20 C3 FF A2 00 8E 4C 41 38 07
0494 AE 00 5B E0 5E D0 05 68 68 4C E5 0B 07
0495 0B 60 0D 0D 53 45 51 55 45 4E 54 99 04
0496 49 41 4C 20 46 49 4C 45 20 4F 52 C7 04
0497 20 50 52 4F 47 52 41 4D 3F 20 28 B0 04
0498 53 20 4F 52 20 50 29 20 00 A9 5C C4 04
0499 8D 19 1C A9 1F 8D 1A 1C 20 0A 1C 86 04
0500 20 E4 FF 8D AF 41 C9 00 F0 F6 C9 EC 08
0501 50 F0 08 C9 70 F0 04 C9 D0 D0 0C DF 07
0502 A9 50 8D AF 41 8D CF 41 20 D2 FF FA 07
0503 60 C9 53 F0 08 C9 73 F0 04 C9 D3 37 08
0504 D0 0C A9 53 8D AF 41 8D CF 41 20 0A 07
0505 D2 FF 60 20 22 18 4C 84 1F A9 00 1C 06
0506 8D 56 41 A9 5C 8D 57 41 20 B8 17 37 06
0507 AD 22 5C C9 20 F0 06 20 68 1C 4C F5 05
0508 C9 0C AD 37 5C 8D CF 41 AD 20 5C D7 06
0509 8D B8 41 AD 21 5C 8D B9 41 A2 01 D7 06
0510 8E 4C 41 A0 00 8C 4F 26 CE 36 41 FF 05
0511 AE 4C 41 BD 86 41 AC 4F 26 99 86 FE 06
0512 41 99 5E 41 C9 00 F0 09 EE 4C 41 B6 06
0513 EE 4F 26 4C 0A 20 AE 36 41 A9 2C D4 05
0514 9D 86 41 E8 AD CF 41 9D 86 41 E8 57 08
0515 A9 2C 9D 86 41 E8 A9 52 9D 86 41 83 07
0516 E8 A9 00 9D 86 41 8E 36 41 60 0D 6B 06
0517 3E C9 CE D6 C1 CC C9 C4 20 C5 CE 7D 09
0518 D4 D2 D9 3C 0D 00 0D 3E CF D0 C5 7D 07
0519 D2 C1 D4 C9 CF CE 20 C1 C2 CF D2 18 0A
0520 D4 C5 C4 3C 0D 00 0D 3E CF 4E 45 5B 06
0521 20 4D 4F 4D 45 4E 54 2C 20 50 4C E1 04
0522 45 41 53 45 3C 0D 00 0D C9 53 20 BA 04
0523 49 54 20 43 4F 52 52 45 43 54 3F 19 05
0524 20 28 59 20 4F 52 20 4E 29 20 00 25 04
0525 0D 20 20 D4 48 41 4E 4B 20 59 4F 18 05
0526 55 2E 0D 00 0D D0 52 45 53 53 20 D8 04
0527 41 4E 59 20 4B 45 59 20 54 4F 20 E3 04
0528 43 4F 4E 54 49 4E 55 45 0D 00 0D 8F 04
0529 C3 4F 4E 54 49 4E 55 45 20 41 4E A5 05
0530 59 57 41 59 3F 20 28 59 20 4F 52 FD 04
0531 20 4E 29 20 00 0D 0D 20 20 20 20 64 03
0532 20 D2 55 4E 54 45 52 4D 20 D0 4C 1D 06
0533 55 53 20 42 59 20 D2 4F 42 45 52 92 05
0534 54 20 D3 49 4D 53 0D 0D 20 20 20 C0 04
0535 20 20 20 20 20 37 38 31 38 20 D3 82 04
0536 55 4D 4D 45 52 46 49 45 4C 44 20 22 05
0537 D2 4F 41 44 0D 20 20 20 20 20 20 8C 04
0538 20 20 D3 55 4D 4D 45 52 46 49 45 87 05
0539 4C 44 2C 20 CE C3 20 32 37 33 35 79 05
0540 38 0D 20 20 20 20 20 20 20 20 20 81 03
0541 20 20 20 39 31 39 2D 36 34 33 2D 17 04
0542 37 38 35 31 0D 20 20 20 20 20 20 C0 03
0543 20 20 C3 4F 50 59 52 49 47 48 54 98 05
0544 20 31 39 38 35 20 42 59 20 D2 55 19 05
0545 4E 0D 0D 00 0D 0D C3 3D 20 4B 45 53 04
0546 59 20 2B 20 20 20 20 C6 D5 CE C3 72 06
0547 D4 C9 CF CE 0D 0D 20 20 20 C1 20 B8 06
0548 20 20 20 20 20 20 20 D6 49 45 57 BF 04
0549 20 48 49 2D 52 45 53 20 2D 2D 20 87 04
0550 54 4F 47 47 4C 45 0D 20 20 20 C2 17 05
0551 20 20 20 20 20 20 20 20 C4 49 53 87 04
0552 50 4C 41 59 20 42 55 46 46 45 52 38 05
0553 20 54 4F 20 53 43 52 45 45 4E 0D D9 04
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Listing 1 continued.

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0554 20 20 20 C3 20 20 20 20 20 20 20 2D 04
0555 20 C3 4C 4F 53 45 20 42 55 46 46 84 05
0556 45 52 0D 20 20 20 C4 20 20 20 20 74 04
0557 20 20 20 20 C4 49 53 50 4C 41 59 43 05
0558 20 44 49 53 4B 20 44 49 52 45 43 00 05
0559 54 4F 52 59 0D 20 20 20 C7 20 20 F1 04
0560 20 20 20 20 20 20 D0 4C 41 59 20 C6 04
0561 41 20 4D 4F 44 45 4D 20 47 41 4D F9 04
0562 45 0D 20 20 20 C8 20 20 20 20 20 4C 04
0563 20 20 20 C3 48 41 4E 47 45 20 42 1B 05
0564 4F 52 44 45 52 20 43 4F 4C 4F 52 4F 05
0565 0D 20 20 20 C9 20 20 20 20 20 20 2B 04
0566 20 20 C3 48 41 4E 47 45 20 42 41 3F 05
0567 43 4B 47 52 4F 55 4E 44 20 43 4F 46 05
0568 4C 4F 52 0D 20 20 20 CA 20 20 20 BC 04
0569 20 20 20 20 20 C3 48 41 4E 47 45 FF 04
0570 20 54 45 58 54 20 43 4F 4C 4F 52 3E 05
0571 0D 20 20 20 CB 20 20 20 20 20 20 33 04
0572 20 20 D2 45 44 45 46 49 4E 45 20 5E 05
0573 C4 C5 CC 45 54 45 20 4B 45 59 0D 86 06
0574 20 20 20 CC 20 20 20 20 20 20 20 4A 04
0575 20 CC 4F 41 44 20 41 20 46 49 4C 5B 05
0576 45 20 54 4F 20 42 55 46 46 45 52 22 05
0577 0D 20 20 20 CE 20 20 20 20 20 20 3C 04
0578 20 20 D3 43 52 41 54 43 48 20 41 6B 05
0579 20 46 49 4C 45 0D 20 20 20 CF 20 DF 04
0580 20 20 20 20 20 20 20 CF 50 45 4E D6 04
0581 20 54 48 45 20 42 55 46 46 45 52 20 05
0582 0D 20 20 20 D0 20 20 20 20 20 20 43 04
0583 20 20 D0 52 49 4E 54 20 42 55 46 91 05
0584 46 45 52 20 43 4F 4E 54 45 4E 54 60 05
0585 53 0D 20 20 20 D1 20 20 20 20 20 7A 04
0586 20 20 20 D1 55 49 54 20 54 48 45 6E 05
0587 20 50 52 4F 47 52 41 4D 0D 20 20 D0 04
0588 20 D2 20 20 20 20 20 20 20 20 D2 10 05
0589 45 4E 41 4D 45 20 41 20 44 49 53 14 05
0590 4B 20 46 49 4C 45 0D 20 20 20 20 66 04
0591 20 20 20 20 20 20 20 20 4E 45 57 39 04
0592 4E 41 4D 45 3D 4F 4C 44 4E 41 4D 69 05
0593 45 0D 20 20 20 D3 20 20 20 20 20 76 04
0594 20 20 20 D3 41 56 45 20 45 44 49 53 05
0595 54 45 44 20 42 55 46 46 45 52 0D 17 05
0596 20 20 20 D4 20 20 20 20 20 20 20 68 04
0597 20 C3 48 41 4E 47 45 20 54 45 52 A6 05
0598 4D 49 4E 41 4C 20 53 45 54 54 49 70 05
0599 4E 47 53 0D 20 20 20 D5 20 20 20 E1 04
0600 20 20 20 20 20 D3 41 56 45 20 42 09 05
0601 55 46 46 45 52 20 55 4E 45 44 49 66 05
0602 54 45 44 0D 20 20 20 D6 20 20 20 DA 04
0603 20 20 20 20 20 D5 50 4C 4F 41 44 40 05
0604 20 42 55 46 46 45 52 0D 0D 20 20 90 04
0605 20 D0 52 45 53 53 20 41 4E 59 20 B2 05
0606 4B 45 59 20 54 4F 20 43 4F 4E 54 5E 05
0607 49 4E 55 45 0D 00 0D 20 20 20 D7 E1 04
0608 20 20 20 20 20 20 20 20 D7 4F 52 D8 04
0609 44 20 57 52 41 50 20 53 54 41 54 5B 05
0610 55 53 0D 20 20 20 D8 20 20 20 20 CF 04
0611 20 20 20 20 D5 50 4C 4F 41 44 20 48 05
0612 4F 52 20 44 4F 57 4E 4C 4F 41 44 7D 05
0613 20 41 20 46 49 4C 45 0D 20 20 20 73 04
0614 D9 20 20 20 20 20 20 20 20 D5 50 64 05
0615 4C 4F 41 44 20 42 55 46 46 45 52 61 05
0616 20 57 2F 50 52 4F 4D 50 54 0D 20 1D 05
0617 20 20 DA 20 20 20 20 20 20 20 20 83 04
0618 DA 45 52 4F 20 42 55 46 46 45 52 04 06
0619 0D 0D 20 20 20 46 38 20 4B 45 59 6C 04
0620 20 54 4F 47 47 4C 45 53 20 42 45 48 05
0621 54 57 45 45 4E 20 43 4F 4D 4D 41 7D 05
0622 4E 44 20 4D 4F 44 45 0D 20 20 20 B2 04
0623 41 4E 44 20 47 52 41 50 48 49 43 60 05
0624 53 20 4D 4F 44 45 2E 0D 00 0D C5 15 05
0625 4E 54 45 52 20 54 48 45 20 50 52 6D 05
0626 4F 4D 50 54 20 43 48 41 52 41 43 74 05
0627 54 45 52 20 00 0D 3E C2 55 46 46 6C 05
0628 45 52 20 CF 50 45 4E 3C 0D 00 0D 33 05
0629 3E C2 55 46 46 45 52 20 C3 4C 4F 6B 06
0630 53 45 44 3C 0D 00 0D 3E C2 55 46 43 05
0631 46 45 52 20 DA 45 52 4F 45 44 3C F9 05
0632 0D 00 0D 3E C2 55 46 46 45 52 20 2A 05
0633 C5 4D 50 54 59 3C 0D 00 0D 3E D5 F1 05
0634 50 4C 4F 41 44 20 42 55 46 46 45 72 05
0635 52 3C 0D 00 0D 3E D5 50 4C 4F 41 62 05
0636 44 20 C2 55 46 46 45 52 20 D7 49 5A 06
0637 54 48 20 D0 52 4F 4D 50 54 3C 0D E4 05
0638 00 0D 3E C2 55 46 46 45 52 20 C6 E9 05
0639 55 4C 4C 3C 00 0D 3E D7 4F 52 44 AF 05
0640 20 D7 52 41 50 20 00 C5 4C 49 4D 21 06
0641 49 4E 41 54 45 44 3C 0D 00 C1 4C 8C 05
0642 4C 4F 57 45 44 3C 0D 00 0D 3E D4 65 05
0643 52 41 4E 53 46 45 52 20 C3 4F 4D 13 06
0644 50 4C 45 54 45 3C 0D 00 0D 3E C3 55 05
0645 4F 4D 4D 41 4E 44 20 4D 4F 44 45 86 05
0646 20 00 CF 4E 3C 0D 00 CF 46 46 3C A3 05
0647 0D 00 0D D1 55 49 54 20 50 52 4F 75 05
0648 47 52 41 4D 2D 2D C1 52 45 20 59 DA 05
0649 4F 55 20 53 55 52 45 3F 20 28 59 6C 05
0650 20 4F 52 20 4E 29 20 00 3E C1 4E 4F 05
0651 59 20 4B 45 59 20 54 4F 20 43 4F 62 05
0652 4E 54 49 4E 55 45 3C 0D 00 0D CF 84 05
0653 52 49 47 49 4E 41 54 45 20 4F 52 A1 05
0654 20 41 4E 53 57 45 52 20 28 4F 20 35 05
0655 4F 52 20 41 29 20 0D 00 0D C6 49 03 05
0656 4C 45 4E 41 4D 45 20 3E 20 00 00 C0 04
0657 00 D4 04 FF 20 18 20 38 31 00 00 29 05
0658 24 30 3A 21 40 21 25 24 90 05 1C 9C 04
0659 9F 9C 1E 1F 9E 81 95 96 97 98 99 1D 08
0660 9A 9B 0B 04 08 08 08 30 31 1A 15 80 04
0661 06 AD 93 02 29 F0 09 06 8D 93 02 27 06
0662 20 CC FF A9 04 8D 19 1C A9 40 8D 66 07
0663 1A 1C 20 0A 1C 20 4A 1C 20 58 1B 2C 04
0664 AD AF 41 8D DA 41 20 D2 FF C9 18 AF 08
0665 D0 01 60 20 87 1C AE 4E 41 E0 01 AB 06
0666 F0 C8 AD DA 41 C9 45 F0 08 C9 65 4E 09
0667 F0 04 C9 C5 D0 12 AD 94 02 29 1F 8A 07
0668 09 60 8D 94 02 A2 02 8E 14 42 4C FC 05
0669 16 27 C9 4F F0 08 C9 6F F0 04 C9 DF 07
0670 CF D0 12 AD 94 02 29 1F 09 20 8D 90 06
0671 94 02 A2 01 8E 14 42 4C 16 27 C9 0E 06
0672 4E F0 08 C9 6E F0 04 C9 CE D0 10 88 08
0673 AD 94 02 29 1F 8D 94 02 A2 00 8E 7F 06
0674 14 42 4C 16 27 20 22 18 4C 97 26 E4 04
0675 A9 62 8D 19 1C A9 40 8D 1A 1C 20 3C 06
0676 0A 1C 20 4A 1C 20 30 18 AD AF 41 55 05
0677 8D DA 41 C9 18 D0 01 60 20 87 1C 22 07
0678 AE 4E 41 E0 01 F0 D8 AD DA 41 C9 1D 09
0679 37 D0 0D AD 93 02 29 9F 09 20 8D 7B 06
0680 93 02 4C 67 27 C9 38 D0 0B AD 93 33 07
0681 02 29 9F 8D 93 02 4C 67 27 20 22 B1 05
0682 18 4C 16 27 A9 26 8D 19 1C A9 40 C5 05
0683 8D 1A 1C 20 0A 1C 20 4A 1C 20 58 B2 04
0684 1B AD AF 41 8D DA 41 20 D2 FF C9 C6 08
0685 18 D0 01 60 20 87 1C AE 4E 41 E0 D6 06
0686 01 F0 D5 AD DA 41 C9 48 F0 08 C9 0E 09
0687 68 F0 04 C9 C8 D0 10 AD 94 02 09 C8 07
0688 10 8D 94 02 A2 01 8E 0F 42 4C D3 84 06
0689 27 C9 46 F0 08 C9 66 F0 04 C9 C6 91 08
0690 D0 10 AD 94 02 29 EF 8D 94 02 A2 B2 07
0691 00 8E 0F 42 4C D3 27 20 22 18 4C 7E 05
0692 67 27 A9 45 8D 19 1C A9 40 8D 1A 82 06
0693 1C 20 0A 1C 20 4A 1C 20 30 18 AD B2 04
0694 AF 41 8D DA 41 C9 18 D0 01 60 20 80 07
0695 87 1C AE 4E 41 E0 01 F0 D8 AD DA C7 08
0696 41 C9 31 D0 0B AD 93 02 29 7F 8D 45 07
0697 93 02 4C 22 28 C9 32 D0 0B AD 93 FA 06
0698 02 09 80 8D 93 02 4C 22 28 20 22 3F 05
0699 18 4C D3 27 A9 98 8D 19 1C A9 3E 03 07
0700 8D 1A 1C 20 0A 1C 20 4A 1C 20 30 9B 04
```

COMMODORE CLINIC

By JIM STRASMA

Do you have a problem or question about your Commodore computer? Commodore Clinic can help. Just send your question (limit one per entry) on a postcard to:

Jim Strasma
Commodore Clinic
PO Box 6100
Macomb, IL 61455-6100

Queries are answered only through this column, but, due to the volume of mail, only those questions that appeal to the majority of our readers will be published. Please do not enclose a self-addressed stamped envelope, since we cannot provide personal responses or answer questions before publication.

UPDATES

Update: In the July issue, Curtis Finke asked about copyrighting a computer program he wrote. For official forms to do this, anyone may write to the following address, requesting Form TX, or call the telephone number any time, 24 hours a day.

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Library of Congress
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202-287-9100

The form will be sent at no charge, in about two weeks. Actual registration will cost $10. If you have other questions for the copyright office, you'll need to call a different number, 202-287-8700, between the hours of 8:30 AM and 5 PM.

REPAIRS

Q: I have an MPS-801 printer. While printing, the print head shot over to the right side of the carriage, and I can't get it back to the left. Can you help?

Robert Caldwell
Logan, WV

A: The 801 uses an unusual carriage-control mechanism that employs a spring to return the print head to the left margin after each line. It sounds like that spring has either broken or unhooked. Once it is hooked up again or replaced, the printer should resume normal operation.

Q: My 1541 manual reads, "Never remove the diskette when the green drive light is on!" My drive had been wired incorrectly, for the green light remained on continuously. I decided to correct the problem. All you have to do is remove the case, which is held on by four Phillips-head screws, remove the metal shield, clip the wires leading to both the red and green lights and then swap them.

G. Povo
Vancouver, WA

A: Your hint absolutely made my day, proving once again that there is both a software and a hardware solution for almost any problem. Unfortunately, your manual is wrong. The above advice was one of the most glaring discrepancies in the original 1541 manual; it has since been corrected. There is no need to rewire the drive; just correct your manual to state, "Never remove the diskette when the *red* drive light is on."

Your note also gives me a chance to warn 1571 disk owners that the green and red lights have been swapped on that model. Thus, the original 1541 manual would not have been incorrect if it had been written for the 1571.

To be sure which light is which, simply turn on your disk drive and note which of the two lights flashes and then turns off, and which one turns on and stays on. The one that flashes is the drive-activity light, whatever its color, and disks should not be removed while it is glowing.

Q: Is there any way that I could get a replacement SID chip from Commodore? I realize that my C-64 is out of warranty. However, is it possible for just one voice to go bad unless it is a defect in the chip that occurred when originally produced? If I cannot get a replacement free of charge, where might I order one and approximately how much will it cost?

Jeff Lozano
Kingsville, TX

A: As with any other consumer product, if you want warranty help from the vendor, test everything during the warranty period. After a year, it is almost impossible to tell whether a faulty chip has always been that way or became so only recently. And yes,

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chips do fail sometimes after working perfectly for months or even years.

You should be able to order a new SID chip for about $50 from any of Commodore's new authorized service centers. To find the one nearest you, phone Commodore's support number at 215-436-4200.

Q: I can't find a monochrome monitor where the readable part of my 64's display can be adjusted to fill the screen, and that includes Zenith, Amdek and NEC. There is always about 1½ inches left over on all sides, which eliminates about one-fourth of the screen. Dealers say nothing can be done, but there must be a way to change something internally to correct this problem.

William Burton
Prairie Village, KS

A: The 1½-inch border is intentional; it assures that all 40 columns will be visible on typical TV sets, most of which, when new, intentionally throw away the edges of the picture they receive. This is known as overscan. Its purpose is to keep the set from needing further adjustment later, since the size of the display picture tends to shrink over the years.

A few monochrome monitors have horizontal and vertical size controls to adjust the degree of overscan, usually on the back of the cabinet. Others have the same adjustments hidden inside the cabinet. A dealer's service department should be able to adjust most monitors to any border width you want. The Plus/4 model also has an Escape command to select a wide or narrow border within the computer itself.

HARDWARE

Q: I am looking for a color monitor. Will any color composite monitor work with the 64? What are items I should be aware of when buying another brand?

Breit Ketterer
Fairborn, OH

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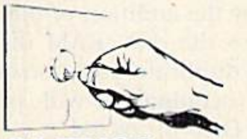

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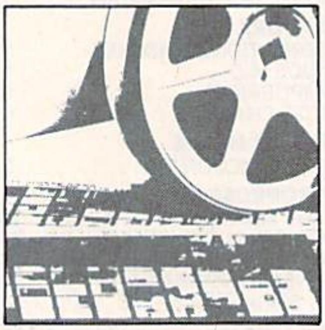

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the 64. Those few that fail seem to have trouble locking in a stable picture, making their incompatibility obvious the moment you try using them with a 64.

Most composite monitors have only one video-in connector, which generally gives satisfactory results. However, for maximum quality, look for a monitor with two separated video inputs, one for chroma (color) and the other for luma (brightness). Since the 64 also sends an audio signal to the monitor, be sure there's an audio-input connector.

If you expect someday to upgrade to either a 128 or an Amiga and want to continue using the same monitor, you may be wise to get a monitor that also has one or more inputs for RGB.

Q: In a store recently, I saw a device that claimed to turn your computer monitor into a television set. Are these devices any good?

Bob Bixby
Honolulu, HI

A: The version I saw, a Cardco product, is a separate TV tuner, which receives broadcasts via cable or an antenna, and then supplies the TV signal to the monitor via the same connectors used by the computer. However, if you own a video cassette recorder, you may already have an excellent TV converter for your computer monitor. Nearly all VCRs include video- and audio-out connectors that can be plugged directly into your monitor. This allows you to use the monitor to view any show your VCR can receive, as well as prerecorded movies, without having to buy any extra equipment.

Q: I've been thinking about building a RAM disk for the 64, now that RAM chips are dirt-cheap. Has anyone ever produced one for the 64? It would have to behave just like a disk drive except that the storage would be in RAM.

Gonzalo Nin
Stockton, CA

A: Shortly after the 64 first became available, Richvale Telecommunications developed a RAM disk with a capacity of something like 400K, although I'm not sure it was ever sold widely. You can also buy from Letco and other vendors extra RAM in bank-switching cartridges that plug into the 64's cartridge port. However, the key to such devices being true RAM disks is that they must be entirely compatible with "real" disks, a condition that, in practice, is nearly impossible.

First, complete compatibility would require RAM disks to operate just as slowly as other disks, something almost no one would tolerate. Also, most of the commercial programs sold for the 64 have been protected against casual copying by the addition of intentional errors to the disk. RAM disks usually don't duplicate such errors, making them incompatible with programs that are DOS-protected.

The key to a successful RAM disk would have been for Commodore to establish standards for how it should work; then other companies could have modified their programs to work with it. Fortunately, Commodore has just done this by announcing a RAM cartridge for the C-128. When I saw it last summer, Commodore expected it would also work with the 64 and that it would be widely available as you read this.

Q: A few weeks ago, I noticed a static-out touch pad. What exactly is it, and is worth having?

Daniel Wilde
Goodlettsville, TN

A: This time of year, static electricity is computer-enemy number 1. Thousands of innocent micros will meet their maker this winter, victims of static shocks brought on by low indoor humidity. The pad you saw is one attempt to prevent such disasters.

The idea is that, after crossing a nylon carpet or other static generator, you touch the pad before touching the computer. The pad is connected to an electrical ground, allowing it to drain off any static charge, just as if you had touched a metal door knob.

The idea behind the pad is excellent and widely used in large computer installations. However, there's nothing magic about the pad; you can achieve the same goal by touching a nearby radiator or faucet.

I'd also suggest minimizing static at its source, by raising the humidity in your computer room (but not enough to cause condensation inside the computer!) and by either removing carpets from the area around the computer or spraying them with an anti-static solution (almost any carpet cleaner will do).

Q: **I have a 1702 color monitor. When I turn it on and hold the back of my hand to the screen, my hairs tingle and stand out straight. Is this radiation that would be harmful to a person?**

William Noice
Richfield, OH

A: What you are feeling is a charge of static electricity, often found on the face of both computer monitors and ordinary TV screens. This is quite different from the X-ray leakage that several years ago caused serious scares about color TVs. TVs and monitors have since been redesigned for added safety, and are now routinely tested to be sure they do not emit harmful radiation. You can reduce the buildup of static, and the dirt it attracts, with an anti-static cleaning spray.

Q: **I've designed several computer work centers (desks) that require very little or no cutting. They are unique, versatile and relatively inexpensive to build. Would it be better to sell my designs as magazine articles or to compile them in a book, and how do you get a "how-to" book published?**

Shirley Gigliotti
117 Rosemont St.
Haverhill, MA 01830

A: I've included your address, in case a publisher is eager to "discover" you. Your idea has merit as both a series of articles and as a book, although you may find it easier to be taken seriously by book publishers after you've already had some articles published in a magazine. Both magazine and book publishers will be happy to send you author's kits, or guidelines, telling you how to write for publication.

One other factor that may be important is how long you can wait for income. *RUN* pays for articles as soon as they are accepted for publication. Most book publishers, on the other hand, don't pay royalties until several months after the completed book goes on sale.

OTHER

Q: **I have to call long distance to access CompuServe. The cost is $78 an hour for the phone bill alone. Is there a way around this outrageous phone bill?**

Rick Strubell
Moodus, CT

A: Yes, you should be able to cut that bill down a lot. Even here in the boondocks, I can call CompuServe for under $20 an hour. One trick is to call when rates are lowest, after 11 PM, before 8 AM, and on Saturday and Sunday before 5 PM. Another trick is to find the cheapest way to call CompuServe. You can access it much more cheaply via local numbers provided in many large cities by Tymnet, Telenet and similar services, rather than by dialing directly to CompuServe's home in Columbus, Ohio. You may also find that it's cheaper to call across state lines than within your own state.

Finally, an "alternative" phone company, such as MCI or GTE Sprint, may offer low-cost, long-distance service in your community. CompuServe will be happy to give you suggested access numbers, and your phone company can tell you which of those numbers would be least expensive to call, plus whether an alternative phone company offers service in your area.

PROGRAMMING

Q: **What is the difference between an assembler and a machine-language monitor? Can I use a monitor instead of an assembler to write machine language programs?**

Troy Lund
Hermantown, MN

A: When computers were first developed, they were programmed directly, in a language composed entirely of numbers that they could execute unchanged. A typical simple instruction was written as 11001000 (binary), with each digit standing for an actual switch within the computer. Later, machine instructions were written in shorter numbers (base 16) that were easier for humans to remember. For the same reason, the numbers were eventually replaced by short words that stood for each instruction, allowing people to write programs as a series of words.

This added a translation step to programming, since computers could still only obey numeric instructions directly. The program that did the translation is called an assembler. Its development was the first great leap forward in software development and heralded the eventual development of Basic.

However, even after the advent of assemblers, there remained a need to view and change numbers in the machine directly, via machine language monitors, so called because they directly monitor the actual values used by the machine.

As this brief history suggests, there is a continuing need in programming for both assemblers and monitors. Short programs can be written entirely with a monitor, but larger programs are much easier to develop with an assembler. Most machine language programmers use at least one of each.

Q: **I recently received a practical gift for my 64—the program Print Shop. However, my MPS-802 printer is not compatible with it. Is there a solution?**

Bruce Bracebridge
Purcellville, VA

A: I receive several letters a week from people who wish Print Shop were compatible with one printer or another. Unfortunately, your 802 handles high-resolution graphics differently from the Commodore printers supported by Print Shop.

If Broderbund Software could be sure of selling enough copies of a new version of Print Shop to recover their costs, they might be convinced to do so. So come on, those of you with unusual printers, drop Broderbund a note describing your printer and promising to buy a compatible new version of Print Shop.

Meanwhile, no printer is 100 percent compatible with every program. Before buying either a printer or a program that uses a printer, be sure the compatibility you need is guaranteed. Better yet, test both together before you buy.

Q: I am one of many who bought a 1526 printer, only to find out later that it would not do what I wanted. I have developed a program to print out on the 1526, using a C-64, character fonts such as Olde English, computer print, a Greek alphabet, small print and large block letters. I would like to know if there is any interest in this program?

Brian Axford
15 Isabel St.
Petawawa, Ontario K8H 1Z1
Canada

A: I imagine you'll be amazed at how much interest your fellow 1526 owners will have in that program, Brian. Thanks for writing.

Q: I often need to change a word or line in a text file. Could you show me a way to edit a sequential file without retyping the whole file?

Peder Sterling
North St. Paul, MN

A: The easy way to edit a text file is with a word processor or terminal program designed for the purpose. Easy Script, from Commodore, VIP Terminal, from Softlaw, and PaperClip, from Batteries Included, are three among many programs with this option. Even programming aids such as SYS RES from Solidus International, and compilers such as Commodore's 6502 assembler/editor include Get and Put commands to ease the editing of sequential files.

Q: I have a 64 and cassette. Is there any Basic statement or short program that will combine programs by loading more than one without erasing previous ones?

Bryson Payne
McCaysville, GA

A: The commands that do what you request are Append and Merge. They are often found in program-

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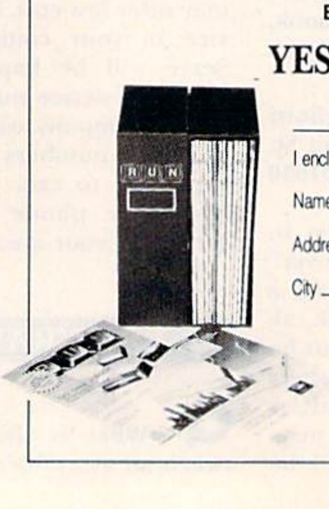

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mer's aids, such as SYS RES (mentioned above) and PAL, from Pro-Line Software. The difference between the two is that Append attaches to the end of the previously loaded programs each new program that's loaded, regardless of its line numbers, while Merge inserts the new program into the existing program line by line, replacing any duplicated lines with the version currently being loaded. Of the two commands, Merge is usually more useful, but each has its place.

Q: **I learned from someone that unless I reformat my disk, I can't save any more programs on it without erasing the whole disk. The problem is that I don't know how to reformat a disk.**

Kevin Honakem
Madison, WI

A: I imagine that was said because there is an error on your disk that keeps you from safely adding any more programs to it. Or your disk may simply be full, and something will have to be erased before you can add any more programs or data to it. Ask your helper to be more clear about why you need to reformat the disk. Then, after copying onto another disk any programs or datafiles you want to keep, reformat the disk by entering the Immediate mode command:

```
OPEN 15,8,15,"N0:BLANK"
```

(Replace BLANK with your own choice of a name for the disk, up to 16 characters.) Notice that this is almost the same as the command used to format a brand new disk:

```
OPEN 15,8,15,"N0:BLANK,00"
```

(replacing "00" with your own one- or two-character disk ID).

Although reformatting a disk takes less time than the original Format command, it only works on disks that have already been formatted at least once and that don't contain any errors. Both versions erase the disk directory, which is why you need to copy everything you want to keep onto another disk before formatting or reformatting disks.

Q: **Does the 64 have any functions like the Locate function on the IBM PC?**

Donavon Simonette
Brooklyn, NY

A: The Locate function in PC Basic serves not only to position the cursor at a chosen row and column, but also to change its size and shape, plus turn the cursor off and on. No one function on the 64 does all these things. However, here is a subroutine you can use to easily position the cursor on any desired row and column:

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```
500  REM LOCATE CURSOR
510  POKE 781,ROW
520  POKE 782,COL
530  POKE 783,0
540  SYS 65520
550  RETURN
```

Call the subroutine with GOSUB 500, after assigning appropriate values to variables ROW and COL.

Q: I have a program that uses Data statements. Some statements are longer than the 80-column logical line limit. How can I concatenate these to accommodate longer lines?

John Schenck
Aberdeen, SD

A: Although there are ways to build data lines longer than 80 columns directly, I prefer to handle such needs by concatenating strings during the program run. To do so, simply read the strings to be concatenated, and then assign them to the same string, using the + sign as a concatenation operator.

Here is an example of a program that reads data lines and combines any over a preset length (five in this example) with the next line of data:

```
10  DATA 123456
20  DATA 789
30  A$=""
40  READ B$
50  A$=A$+B$
60  IF LEN( B$) > 5 THEN 40
70  PRINT A$
```

Q: My 64 always has displayed an Out of Data error when I run a program with a Read statement. What can I do?

Louis Minakaki
Brooklyn, NY

A: An Out of Data error means your program attempted to read more data than the program contains. In the previous example, adding another Read (i.e., 80 READ C$) statement would cause this error. Accidentally omitting a comma when typing in a data line is a common cause of the error. To trace the problem, add a Print statement just after each Read, to show what has been read, and perhaps a counter variable as well, to show how many items have been read. R

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Compiled by SUSAN TANONA

ST10C Hard Disk Drive

A Hard Disk Drive To Increase the Power Of Your Commodore

If you are the system operator of your own BBS, run a small business or a Commodore-equipped computer lab, you've no doubt thought that a disk drive capable of storing large amounts of information would be helpful.

If you are serious about such an application, Computer Specialties, Inc. (CSI) may have your solution.

In a package not quite as big as a bread box and weighing considerably more than a 1541 disk drive, the ST10C offers 10 megabytes (that's 10,000,000 bytes) of storage all in one drive. If you think in terms of blocks, that's over 39,000 blocks of information.

Operation of the ST10C is a snap. For all of its power, there's very little new learning to be done in order to use it.

Hard disk systems are sealed units. You don't change the disks the way you do with a floppy disk drive. The disk itself is contained in a sealed enclosure.

The drive is quite small. The rest of the unit consists of a power supply and, just like the Commodore disk drives, a small computer of its own.

To put the drive to work, you may connect it with a standard serial cord, just like the one you use with a 1541. When connected this way, however, you'll get all the annoyance of the 1541's slow loading time.

CSI has also included an IEEE connection, and, with the proper interface, the drive can be connected through this to create a noticeable increase in speed.

On the rear panel of the drive are two small switches. One allows you to configure the drive as either device number eight or nine. The other is a safety switch. Normally, it sits in the disable position. This keeps you from accidentally performing a New command on the hard disk. The switch must be thrown to the enable position for you to erase the disk.

Upon power up, the ST10C performs its own diagnostics. These take a bit longer than you may be used to, but there's no need to panic. When all is determined to be in working order, a green LED indicator and the red light on the drive itself will come on.

Also located on the front panel is a backup switch. With a regular disk drive hooked up, you can automatically copy the entire contents of the hard disk to a floppy disk. As each floppy fills up, the green light will flash, prompting you to change disks and continue. What is missing is an automatic way to reboot the hard drive. You can accomplish this using the Butterfield Copy-All program supplied. It would be simpler if this capability were built into the hard drive itself.

I've had the ST10C in continuous operation for over 60 days, with no sign of any problems. I did find the whirring sound of the drive a bit distracting, but this is a minor drawback and may not bother you at all.

The documentation consists of a 22-page manual. It's definitely not a complete study in disk drive operation. The assumption is made that you are already familiar with Comodore DOS commands and procedures.

The ST10C really shines in a computer lab environment. In conjunction with several additional CSI products, such as a multi-user switch that allows you to hook up a number of computers to the ST10C, this drive can be the basis for a terrific system.

At $1595, not too many individuals are going to be adding a hard disk drive to their system. However, this unit would be a very useful and viable product for a user's group (perhaps for use with a BBS), a small business or an educational organization. *(Computer Specialties, Inc., 726 East New Haven Ave., PO Box 1718, Melbourne, FL 32902. $1595.)*

Jim Grubbs
Springfield, IL

PPI with Graphics

A Parallel Printer Interface that's Good Value for Your Money

The PPI with Graphics parallel interface bridges the gap between serial and parallel printers by eliminating the usual set of DIP switches located on most parallel interfaces. This does not imply that the PPI interface is an outdated version of a transparent parallel interface; rather, it is a sophisticated interface designed to allow parallel printers to emulate the Commodore 1525/801 printers and permit control codes to alter print modes.

The PPI is a high-quality interface that is compatible with the C-128 in C-128 mode. The package includes a six-pin DIN serial connector, a power connector, a 36-pin Centronics connector for the printer's port, and an in-line microprocessor housed in a sturdy metal box.

The 16 control codes, which help compensate for the lack of in-line DIP switches, are listed in the 16-page manual that accompanies the interface. These are standard print codes for parallel interfaces.

We have had the PPI in the *RUN* technical department for several months and have exposed the unit to heavy use on a wide variety of parallel printers. The interface's rugged design and ease of use have helped to make it everyone's favorite when a parallel interface is needed.

However, the PPI's power connector for the cassette port won't win any praise from the staff. The plastic connector is substantially more rigid and easier to align with the cassette port than some other parallel interface power connectors on the market; but it is still easily bent with repeated use.

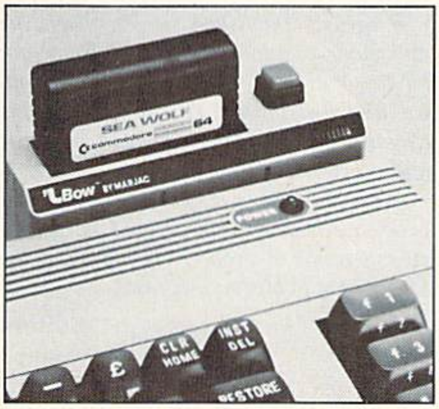
Another common problem with power connectors on parallel interfaces is the tendency for the power cable to break off, and the PPI is no exception. After a few months of use, the power connector's wire did break off. A soldering iron and a dab of electrical solder fixed the unit, but an improved power-connector design is what is really needed to cure this problem permanently.

The PPI with Graphics permits the use of the printer's character set by using a secondary address (either 4 or 5) to bypass the 1525 default character set. A feature of greater significance is the interface's ability to allow simultaneous 1525 emulation *and* use of the printer's character set. (Two exceptions are noted in the manual.)

I've only extensively tested the control codes and printing examples given in the manual on the Gemini 10X printer. However, I didn't run into any compatibility problems in using the interface with several other printers. Since most software for Commodore computers is designed for the 1525 printer, the importance of the PPI's outstanding 1525 emulation really cannot be overemphasized.

If you're contemplating the purchase of a parallel printer, or would like to replace your existing parallel interface, you'd be wise to try the PPI. Ease of use and superb 1525 emulation make this interface a sound investment for your Commodore. *(D.S.I., 717 South Emporia, Wichita, KS 67211. $49.95.)*

Tim Walsh
***RUN* staff**



LBow Cartridge Port Converter

Save Wear and Tear on Your Cartridge Port with This Handy Peripheral

For those of you who frequently use interfaces and cartridge software, the LBow Cartridge Port Converter will be a relief for your C-64. You simply keep the LBow plugged into the cartridge port all the time, and, instead of wearing out your computer's port, you can let the LBow take the abuse. The LBow can really prolong the life of your computer.

Physically, this converter resembles the letter L, and it provides two ports where only one existed before. One port, vertically mounted on the top of the L, is for use with frequently changed software cartridges (such as games and applications). The other port, horizontally mounted on the back of the L, is best used for permanent attachments, such as transparent IEEE interfaces.

You will find that the vertical port is actually easier to deal with than the traditional horizontal ports of the C-64. You can more easily see what you are doing when you plug in a cartridge, and it is easier to insert it into the LBow than it is to wrestle with inserting it into the back of the computer.

The LBow does, however, have its drawbacks. For example, it does not provide a switch that lets you choose which of the two ports you want activated. Because of this, you can't have two software cartridges plugged in at once; the computer won't boot up at all with this configuration.

The LBow will only work with both ports filled if you have some kind of transparent interface plugged into one and a cartridge containing some software plugged into the other. I tested my LBow with an MSD C-64 IEEE interface, which allowed the software cartridge I had in the top port to run unhindered. It also worked with a MIDI interface and a software cartridge in place. You should be sure that the interface you want to keep plugged in permanently is totally transparent.

In addition to the two cartridge ports of the LBow, there is also a reset switch. This lets you restart your computer without having to turn off the power switch. A program is also included that will recover a program that may have been lost by a reset.

The LBow is one of several cartridge expanders on the market today. I like it because of its compact size, but I was disappointed that there was no selector switch. It doesn't benefit those users who want to keep two software cartridges plugged in all the time.

For others, however, the LBow might work out just right. It's inexpensive, and is nicely designed to match the color and contour of your C-64. *(T.I.E. Limited, 2061 West Mill Road, Milwaukee, WI 53209. C-64/$19.95.)*

Margaret Morabito
***RUN* staff**

THE MAIL RUN

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Commodore Customer Support

I recently purchased the C-128 and have been experiencing some problems. Following the advice of the manual, I tried calling the 800 customer-support number. After several attempts, I received a recorded message informing me that this number has been disconnected. What has happened to the customer support center for the C-128?

Bill Corbett III
Holyoke, MA

Local service and information is now available to Commodore computer owners through the creation of a national network of service centers. We published a list of these services, by state, in RUN*'s July through September issues, with an update in November.*

Commodore's toll-free number has been discontinued, but the company has a new service number: 215-436-4200.

Editors

RUN's Copyright Policy

We would appreciate a statement of policy or your permission to place purchased disks of *RUN* magazine programs in our library at The Jersey Shore Commodore User's Group.

Robert McKinley, Jr.
Tinton Falls, NJ

Unfortunately, we cannot grant you permission to distribute through your user's group library programs published in RUN *or on ReRUN. Such a practice is contrary to the copyright law protecting programs published by computer magazines and software manufacturers.*

RUN*'s policy dictates that we retain all rights to published programs, and we do not transfer those rights to other parties. Making these programs available to user's group members would jeopardize our promotional efforts for both* RUN *and ReRUN.*

Programs published in the magazine and made available though ReRUN are for personal use only. They cannot be copied and distributed. Disclaimers to this effect are published in each magazine issue and on each ReRUN package.

While you may or may not agree with this policy, we hope you understand the magazine's position and concern in protecting the copyright of published programs.

Editors

Hotware?

I wish to comment on Batteries Included's "Stolen Property" ad on p. 81 of your September 1985 issue. I find that ad, which warns against copying copyrighted software, to be, at the very least, offensive and insulting.

Worse yet is the paranoia of the software industry, with their damnable copy-protection schemes that send the 1541 disk drive head banging and crashing to the far limits of its travel, ultimately requiring numerous realignments. Even Commodore's very own, ever-popular Easy Script disk intentionally crashes the head numerous times, taking painfully long to load because of this. One popular game takes almost ten minutes to load because of its "protection"; without it, the same game can be loaded in seconds. Some of these disks are so borderline that, within weeks, they self-destruct and refuse to load, forcing the customer to buy another.

Thanks to new hardware/software packages, Commodore owners can make *un*encumbered fast-loading backups of these difficult disks, and I don't blame us for being forced to do so. Furthermore, as more of us want to transfer these programs to hard disk drives, we have *no choice* but to go through these steps.

I own originals of every program that I use, and it's my documented legal right to make a backup copy to preserve the original. It is also my legal right to loan my originals to another person. If that were ever to change, we would have to burn every public library in this country. *None* of this is piracy!

David P. Kemmer
Oronoco, MN

Praise for Micro Compiler

Bravo! Victor Cortes' Micro Compiler program ("Byte-Size Compiler," *RUN*, August 1985) was one of the finest utilities you've published.

Unlike the cheaper commercial compilers, this compiler works amazingly well with true machine code. Thank you for providing such a neat program.

John F. Jarrett
Bronx, NY

A Call to Readers

This page is your stage, so stand up and say a few words. Extend praise, air grievances or offer hands-on advice and information.

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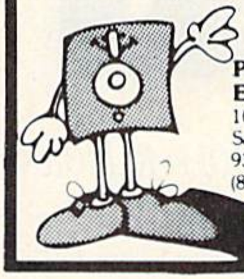

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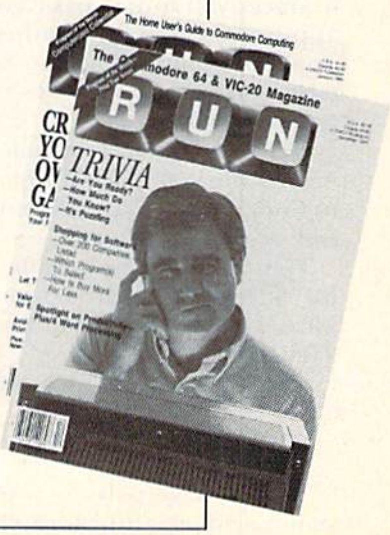


NEW PRODUCTS RUNDOWN

Compiled by HAROLD R. BJORNSEN

Dawn Patrol

Mark of the Falcon (2190 West Drake, Suite 177, Fort Collins, CO 80526) has released Dawn Patrol, a real-time World War II submarine simulation game for the C-64.

As commander of an attack submarine, you must outwit the enemy ships, whose positions and actions are calculated by the computer. Many factors, such as fuel, torpedoes, damage and locations of the enemy vessels, must be considered when planning a strategic attack. The game is easy to learn at the lower levels of difficulty. Dawn Patrol is available on disk for $24.95.

Check Reader Service number 400.

The Muppets Teach You the Computer

Welcome Aboard is a tutorial that teaches novice computer users how to use their C-64s.

A crew of Muppet characters introduces you to five basic computer applications: programming, word processing and electronic mail, database management, games and computer-aided designs.

Welcome Aboard includes documentation and "The Muppet Guide to Computerese," an illustrated glossary of computer terms.

The program is available on disk for $24.95 from Broderbund Software, 17 Paul Drive, San Rafael, CA 94903.

Check Reader Service number 401.

Video Digitizer

This package permits you to construct a black-and-white video digitizer at low cost. The package includes machine language software, plans, documentation and a blank printed-circuit board. You supply the components (available at Radio Shack for about $20) and the time to assemble.

Available for the C-64 for $39.95 from Kinney Software, Dept. R, 121 N. Hampton Road, Donnelsville, OH 45319.

Check Reader Service number 402.

For VCR Users

VideoFile (from VideoFile, PO Box 480210, Los Angeles, CA 90048) is a program that keeps track of up to 150 video programs on up to 50 videotapes.

It allows you to define three categories for programs, listing the shows by category, in order of length or alphabetically. It searches your VCR tapes for the best space to record new material and can also locate any show on the tapes.

The program will also prevent you from accidentally erasing programs, and it automatically converts VCR counter numbers into an hours/minutes format. Available on disk for the C-64 for $49.95.

Check Reader Service number 403.

QuantumLink

For a monthly $9.95 fee, QuantumLink subscribers have 24-hour access to many services, including the Commodore Software Showcase (a software catalog), Commodore Information Network, People Connection, Just For Fun (trivia quizzes, contests and entertainment news), Shopping Center, Learning Center, News & Information, Customer Service Center and Communications Software.

QuantumLink (8620 Westwood Center Drive, Vienna, VA 22180) also plans to include banking, investment and financial planning services.

New purchasers of Commodore 1660 (300 baud) and 1670 (1200 baud) modems receive communications software and free service for the first month.

Check Reader Service number 404.

For Screen Voyeurs

St. Mars Systems (1400 Clay St., Winter Park, FL 32789) has released Windows, a screen processor utility for the C-64.

Windows gives windowing capabilities to Basic and assembly language programs and features individual window color controls, window move commands, independent window scrolling, cursor positioning routines and an unlimited number of windows. Available on disk for $24.95.

Check Reader Service number 405.

Free Catalog

MIRC (4000 Middlefield, Palo Alto, CA 94303) is offering a free 80-page catalog describing 157 current market research reports in the communications and computer industries.

Reports are grouped by subject, such as artificial intelligence, components, computers, computer-aided systems, data communications, graphics, lasers, software and work stations.

Check Reader Service number 406.

Idle Time II

Able Software (PO Box 422, Kulpsville, PA 19443) has released the C-64 version of Idle Time II.

Following the parameters set in the original Idle Time, Idle Time II is a collection of eight games that can be played against the computer. Two of the games also feature two-player versions.

Games include testing your knowledge of cities in the United States, rearranging jumbled words and solving a cube puzzle. Available on disk for $19.95.

Check Reader Service number 407.

SIGNALMAN
LIGHTNING 24

Lightning 24

Anchor Automation (6913 Valjean Ave., Van Nuys, CA 91406) releases an intelligent 2400 bps data modem with auto-dial/auto-answer capabilities, low power consumption and three-speed operation.

Designated the Signalman Lightning 24, it operates asynchronously at 2400 bps with an automatic equalizer to ensure clear transmission over all but the worst telephone lines and fallback to 1200 or 300 bps if the telephone line cannot support 2400 bps. Available for the C-64 for $599.

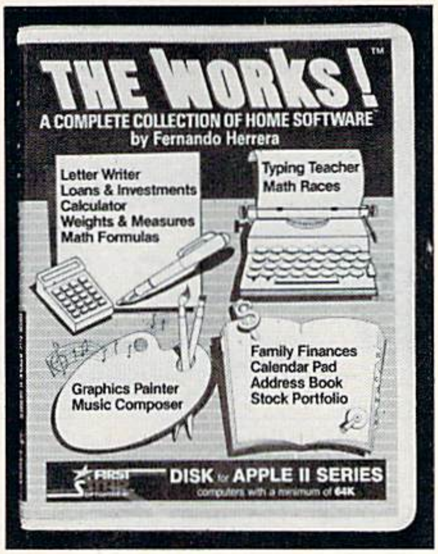
Check Reader Service number 408.

For Food Lovers

Scarborough Systems (55 S. Broadway, Tarrytown, NY 10591) introduces the C-64 version of The Original Boston Computer Diet.

The program develops an individualized diet for you by analyzing personal data such as weight, height and eating habits. These factors are incorporated with data on your psychological and behavioral traits to create a program designed to modify your eating habits. Available on disk for $49.95.

Check Reader Service number 412.



The Works!

First Star Software (18 East 41 St., New York, NY 10017) has released The Works!, a productivity program for the C-64. The Works! is divided into four categories: organizers, tools, learning and arts.

Among the individual modules are Graphics Painter, Typing Teacher, Music Composer, Letter Writer, Stock Portfolio, Calendar Pad with Index Cards, Calculator, Math Drills, Conversions, Address Book and Finance Record-Keeper. It is available on disk for $49.95.

Check Reader Service number 410.

Solve Your Problems

Harvsoft (PO Box 725, Kenmore, NY 14217) has released its Creative Problem Solving program for the C-64. It allows you to evaluate personal, financial and business problems by weighting your input. The printed output produced by the program ranks information showing the best solution and includes a breakdown of each idea and an analysis of the factors involved. The program is available on disk for $29.95.

Check Reader Service number 417.

Fly the Competitive Skies

AcroJet—The Advanced Flight Simulator allows those of you who have soloed in Solo Flight to now pilot your own jet, the BD5-J. In it, you can participate in a decathlon of sport aviation events, including spot landings, ribbon cuts, acrobatics and other high-performance maneuvers.

AcroJet features 3-D graphics, multiple radio and navigation instrumentation and quick-response maneuverability. Available on disk for the C-64 for $34.95 from MicroProse Software, 120 Lakefront Drive, Hunt Valley, MD 21030.

Check Reader Service number 413.

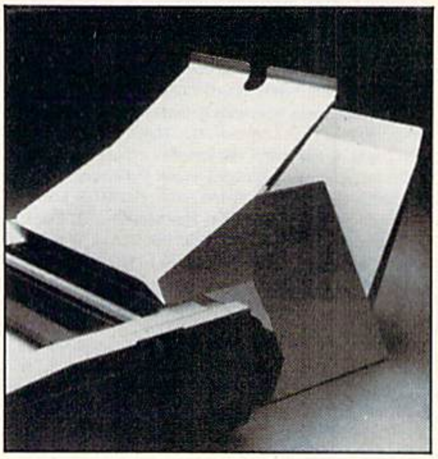
Subscribe to Viewtron

Viewdata Corp. of America (1111 Lincoln Road, 7th Floor, Miami Beach, FL 33139) announces the availability of its Viewtron videotex service to Commodore computer owners.

As a subscriber, you get up-to-the-minute news, weather forecasts, continuous sports scores, current stock prices, airline schedules and fares, consumer reports, movie and book reviews and access to an up-to-date encyclopedia. You can also send electronic messages, pay your bills and get account balances.

To get Viewtron, you must purchase the Viewtron Software Starter Kit for $9.95. The kit includes a disk with communications software, an ID and password, and a user's manual.

Check Reader Service number 414.



Fanfold I/O System

The Porter system (Peri-Comp, Inc., PO Box 188, Lake Geneva, WI 53147) holds blank paper for the printer and displays and stores the resulting printout. It is positioned behind the printer and holds up to 1000 sheets of fanfold paper.

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printers for $64.50 and $74.50, respectively.

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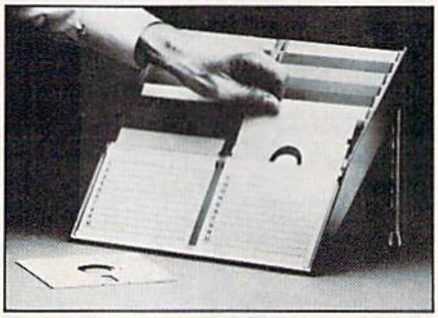

Diskporter

Potomac Industries (2300 M St. NW, Suite 400, Washington, DC 20037) offers a slim-profile storage case that keeps the labels exposed on 20 disks that it stores for permanent organization and direct access, eliminating the need to flip through files. With its cover flipped back as an easel stand, it doubles as a copyholder without adding to workspace; closed, its dimensions are 1½ inches deep by about one foot square. Diskporter organizers are available for $29.95.

Check Reader Service number 409.

Where's Santa Claus?

BitCards (30 W. Service Road, Champlain, NY 12919) has released an enhanced version of A Christmas Adventure, a Christmas game for the C-64.

Santa has mysteriously disappeared in his ice castle at the North Pole and, with Christmas only hours away, his annual gift-delivery run is in jeopardy. Your mission is to explore the many rooms of the castle and its outbuildings, unravel the mystery of Santa's disappearance, and find and free him. Available on disk for $24.95.

Check Reader Service number 415.

Church Service

Sunday School Master Writer is a database program designed for Sunday school record keeping that holds 800 records of members on a single disk.

The records can be easily accessed for additions and deletions. Printed output includes data on members, quarter roll sheet, birthday report, address labels and an attend/visit report. The program is available on disk for the C-64 at $99.95 from UHL Research Associates, Inc., 7926 Berner St., Long Beach, CA 90808.

Check Reader Service number 416.

Hide 'N Sequence

In Hide 'N Sequence, a new educational package for the C-64 from Sunburst Communications (39 Washington Ave., Pleasantville, NY 10570), students choose from a series of literary passages whose sentences have been scrambled. The goal is to reassemble the passage until their versions match the original.

The writings are divided into four styles of discourse: narration, exposition, description and persuasion. Students use what they've learned about organization and sequence in different kinds of writings when creating their own stories on the program's built-in editor.

Hide 'N Sequence is available on disk in three separate packages: elementary, junior high and senior high. Each package retails for $69.

Check Reader Service number 418.

Fly the Unfriendly Skies

In Falcon Patrol II, a new game from Artworx (150 North Main St., Fairport, NY 14450), you control a Falcon Fighter equipped with the latest air-to-ground and air-to-surface missiles to combat the enemy's helicopter-attack squadrons.

The game features 3-D graphics and sound effects and has 16 levels of difficulty. Available on disk for the C-64 for $19.95.

Check Reader Service number 411.

The Keeper

The Keeper, from Marvco Electronics (15702 S. Neibur Road, Oregon City, OR 97045), is an 8K RAM cartridge with battery backup for the C-64. The Keeper's memory works like the internal RAM of the computer, except that its data is retained after power-down. It also contains software that allows you to create auto-starting programs more easily than with a PROM programmer. The cartridge is available for $49.95.

Check Reader Service number 419.

How to Type in C-64 Listings from *RUN*

Type in 64 Perfect Typist (see Listing 1) and save it to either tape or disk before running it. If you make a mistake entering the Data statements, a message will be printed on your screen. Correct any errors and save the new version.

When you want to type in a C-64 program from *RUN*, first load and run 64 Perfect Typist. Two SYS numbers will be displayed on your screen. Jot these down and keep them handy. They are the SYS numbers for deactivating the checksum and reactivating it.

You might want to deactivate the checksum in the middle of your program entry for some reason. The only way to accomplish this, besides turning off the power, is to type SYS 40794 and press the return key.

After 64 Perfect Typist has been loaded and run, start typing in your program lines just as you normally do. The only difference is that after you have pressed the return key to log in your line, a one-, two- or three-digit number will appear below the line on the left-hand margin. This number, the checksum, will be from 0 to 255.

If the number matches the checksum value given in the program listing, the line is correct, and you can type the next line right over the previous line's checksum value. If the checksum values are different, look through the line for typing or spelling errors. Make any needed changes and hit the return key again. Continue until the program is finished.

When you have entered your program, disable 64 Perfect Typist (by typing the SYS disable number that is shown on the start-up screen), and then save the program as usual. If you run the program and get an Out-of-Memory error, turn the computer off and back on. This will clear 64 Perfect Typist out of memory.

You may save part of a program at any time and continue later. If you've already turned your computer off, you'll have to reload and rerun 64 Perfect Typist, then reload the program you were working on, list it and continue where you left off.

How to Type non-C-64 Listings from *RUN*

For listings other than C-64, we have translated everything we thought might be confusing in any program. When you see something between the curly brackets, all you have to do is press the keys indicated. For example:

{SHIFT L}—means hold down the shift key and press the L key.

{COMD J}—means hold down the Commodore key (it is on the lower left side of the keyboard) and press the J key.

{SHIFT CLR}—hold down the shift key and press the CLR/HOME key.

{HOME}—press the CLR/HOME key without shifting.

{CTRL 6}—hold down the control key and press the 6 key.

{FUNCT 2}—function 2 (in this case, you hold down the shift key and press the function 1 key).

{CRSR UP}{CRSR DN}{CRSR LF}{CRSR RT}—these are the four cursor directions.

{UP ARROW}—means the arrow key (the one with the pi sign under it).

{LB.}—the British pound sign (£).

{PI}—the pi sign key (π); (shift and press the up-arrow key).

In some instances, when numerous characters or spaces are repeated, we will represent them this way: {22 spaces} or {17 CRSR LFs}.

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Listing 1. *64 Perfect Typist program.*

```
1 REM 64 PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17013
7 REM
10 POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
20 PG=PEEK(56):ML=PG*256+60
30 FORX=ML TO ML+154:READD:T=T+D:POKEX,D:NE
   XT
40 IFT<>16251 THEN PRINT"ERROR IN DATA...":
   END
60 POKEML+4,PG:POKE ML+10,PG:POKE ML+16,PG
70 POKE ML+20,PG:POKE ML+32,PG:POKE ML+38,P
   G
80 POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}****************
   ************************"
90 SYS ML:PRINT "{CRSR RT}** 64 PERFECT TYP
   IST IS NOW ACTIVE{2 SPACEs}**"
100 PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs}
    SYS"ML+30"=OFF **"
101 PRINT"{CRSR RT}*************************
    ***************":NEW
110 DATA 173,005,003,201,003,208,001,096
120 DATA 141,105,003,173,004,003,141,104
130 DATA 003,162,103,160,003,142,004,003
140 DATA 140,005,003,096,234,234,173,104
150 DATA 003,141,004,003,173,105,003,141
160 DATA 005,003,096,032,124,165,132,011
170 DATA 162,000,142,240,003,142,241,003
180 DATA 189,000,002,240,051,201,032,208
190 DATA 004,164,212,240,040,201,034,208
200 DATA 008,072,165,212,073,001,133,212
210 DATA 104,072,238,241,003,173,241,003
220 DATA 041,007,168,104,024,072,024,104
230 DATA 016,001,056,042,136,016,246,109
240 DATA 240,003,141,240,003,232,208,200
250 DATA 173,240,003,024,101,020,024,101
260 DATA 021,141,240,003,169,042,032,210
270 DATA 255,169,000,174,240,003,032,205
280 DATA 189,162,003,189,211,003,032,210
290 DATA 255,202,016,247,164,011,096,145
300 DATA 013,032,032
```

RUN AMOK

Item: An editorial error crept into Table 1 of High-Spirited Sprites in the October 1985 issue (p. 36). Lines 5–8 of the table should read:

f5: Animates sprites #0 and #1
f6: Animates sprites #0, #1 and #2
f7: Translates grid into sprite #0
f8: Translates sprite #0 into grid

Item: Listings 2 and 3 of Sensational Screen Trilogy (October 1985, p. 90) were inadvertently pasted under the wrong captions. The captions are correct with respect to references in the article, and the REMs in the program identify them correctly; the listings were simply mispositioned.

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January

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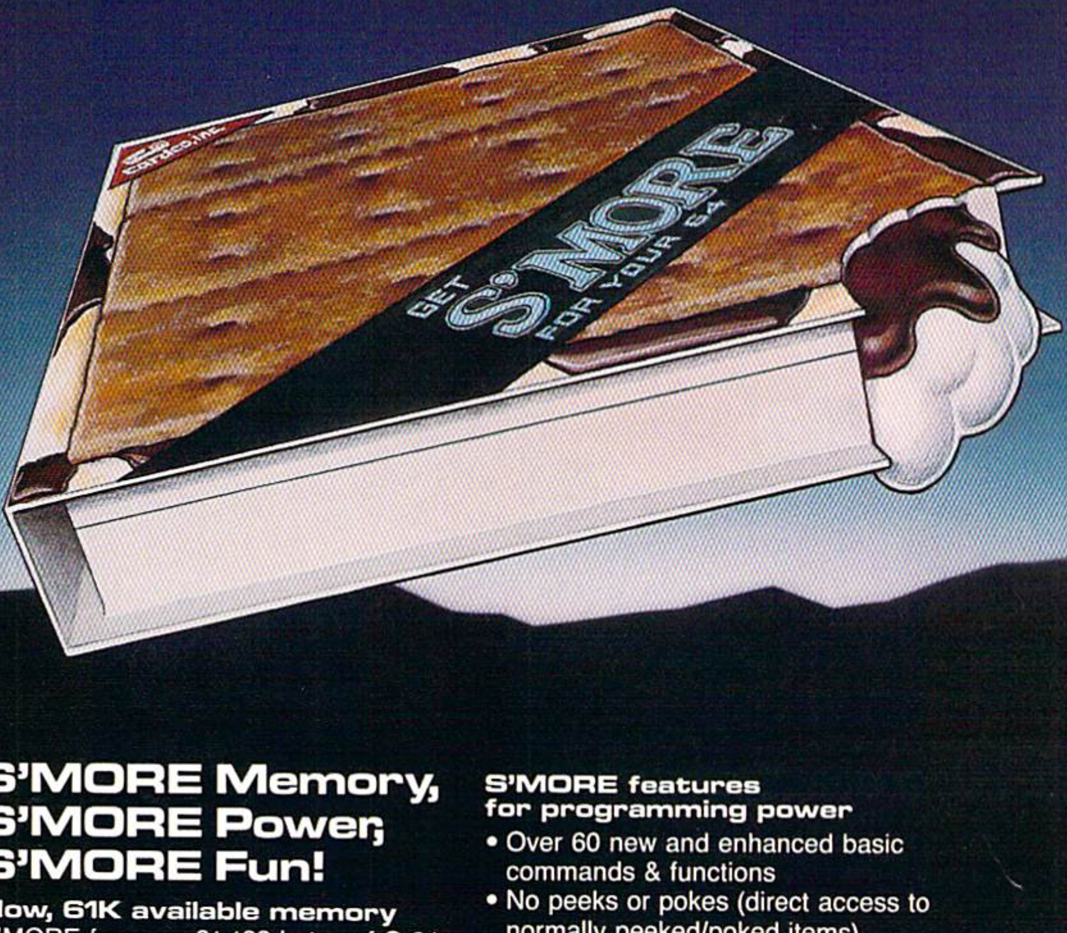

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